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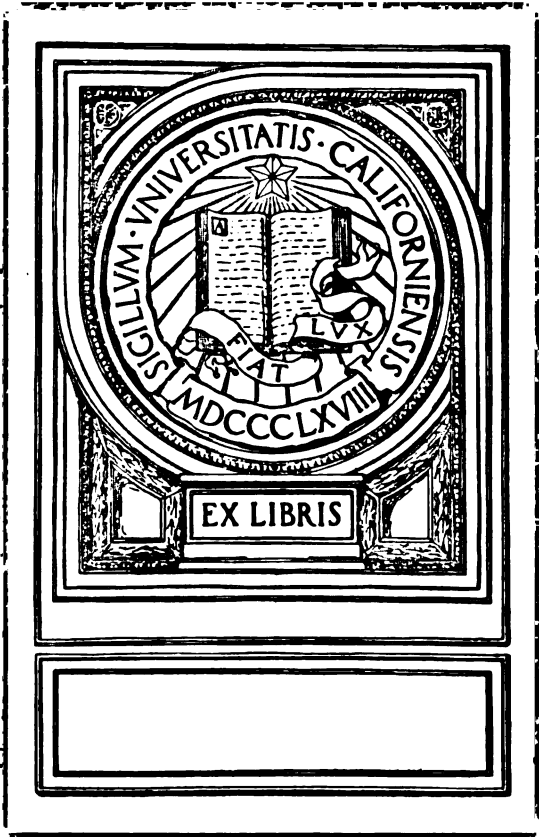
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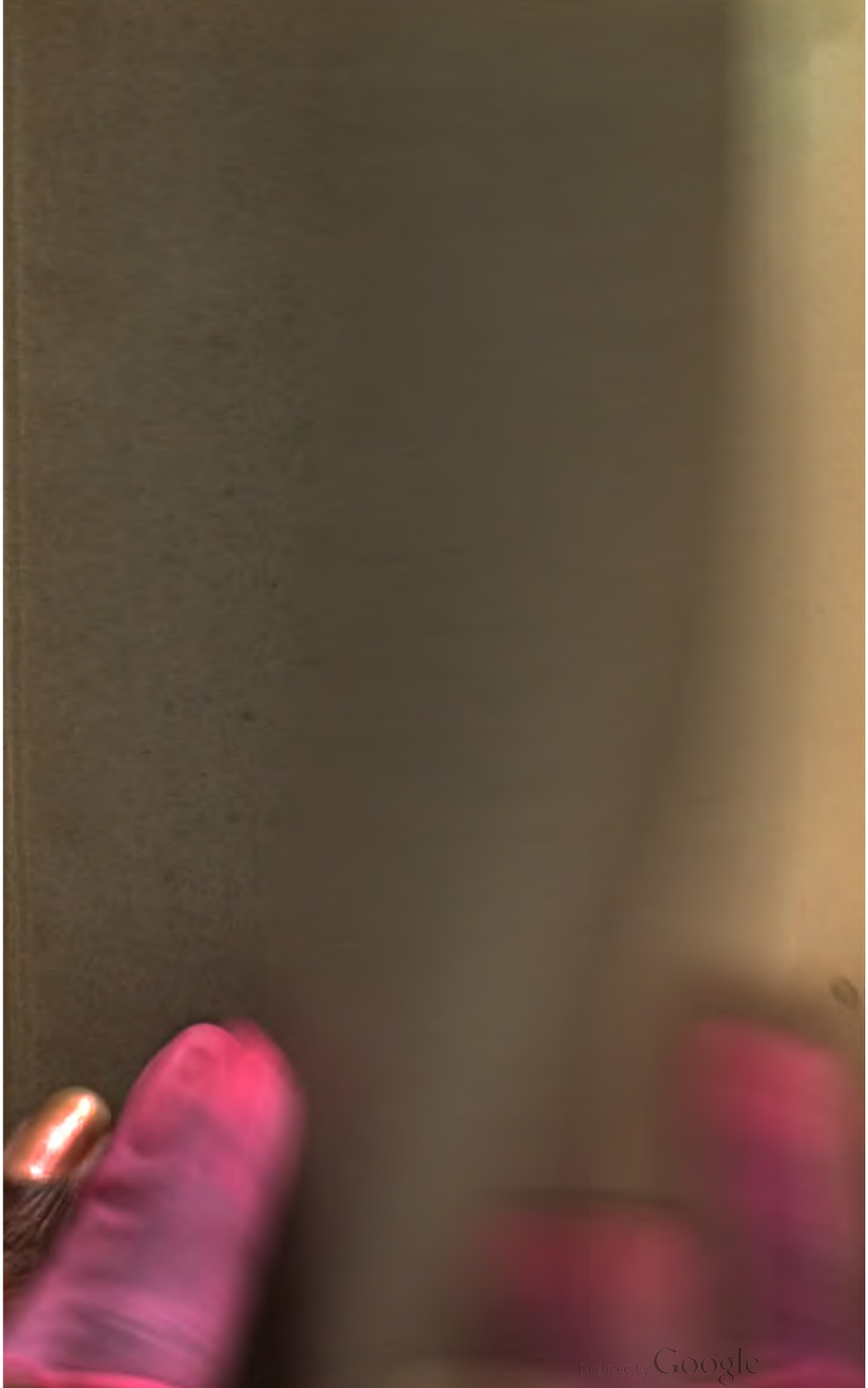
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Immanuel Kant

Houston Stewart Chamberlain, Baron Algernon
Bertram Freeman-Mitford Redesdale





IMMANUEL KANT

BY HOUSTON STEWART CHAMBERLAIN
FOUNDATIONS OF THE NINETEENTH CENTURY. Translated from the German by JOHN LEES.
With an Introduction by LORD REDESDALE. Two volumes. Demy 8vo.

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TO THE
ARTIST



Houston Stewart Chamberlain

*From an original clay model by the artist
by Joseph S. H. H. H.*

·IMMANUEL KANT·

A STUDY AND A COMPARISON
WITH GOETHE, LEONARDO DA VINCI,
BRUNO, PLATO AND DESCARTES BY
HOUSTON STEWART CHAMBERLAIN
AUTHORISED TRANSLATION
FROM THE GERMAN BY
LORD REDESDALE, G.C.V.O., K.C.B.
WITH AN INTRODUCTION BY THE
TRANSLATOR, IN TWO VOLUMES
WITH EIGHT PORTRAITS. VOLUME I

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TRANSLATOR'S INTRODUCTION

IF there be one defect more peculiarly English than another it is the tendency to sneer at everything foreign, at everything that is not familiar, everything outside the daily experience of our narrow life. Talking the other day with a man of acknowledged ability and great public worth, I happened to mention the name of Kant. "Of one thing I can assure you," said my friend, "I am too old to have anything to do with German philosophy." Coming from such a man these words set me wondering. Does there, after all, exist such a thing as German philosophy? Surely philosophy is the common possession of all mankind, not the monopoly of any one race or language. There can be few men in the world, whatever their nationality may be, who do not sometimes "think about thought." The famous misunderstood "Cogito ergo sum" of Descartes, concerning which Chamberlain has much to say, must often come into the least thoughtful minds. Why am I? What am I? What are the relations between me and the world? are questions which are no more than what is contained in the old Greek precept *γνώθι σεαυτόν*.

The investigation of the laws of human thought, its objects, methods, and results, belong to all humanity, otherwise it is nothing. And in the case of Kant, that great Lord of Thought, how far can he be called German? Have we Britons, too, not some small hereditary share in the legacy which he has left to the world? True he was the son of a humble saddler of Königsberg—Königs-

berg, where he was born and educated, and which he never left during all the long eighty years of his life, not even for a butterfly's summer holiday. But that saddler was a Scot by origin. How he and his had found their way to that far away northern town at a time when travel was so difficult, I know not, but it is a feather in the cap of our country, that perhaps the most wonderful brain that ever thought, the brain whose power was, as Goethe said, so great that even those who had never read Kant were nevertheless unwittingly influenced by his writings, came of our blood. We may be proud that we too have our part, remote though it be, in his glory.

It is well that the latest, and by no means the least, tribute to this gigantic intellect should have been paid by an Englishman, albeit he has chosen the German language as the vehicle for his thought. Mr. Chamberlain's countrymen must always regret the circumstances that have caused him to adopt a foreign country and a foreign tongue. In my introduction to another masterpiece of his, "The Foundations of the Nineteenth Century," I have given the causes of that alienation—an alienation not altogether of his own choosing. I need not repeat the story here.

I make no apology for my attempt to reproduce his work upon Kant in an English dress for the benefit of those of Mr. Chamberlain's countrymen to whom the German language is a hindrance. The task which I have set myself has been one of great difficulty. It is comparatively easy to translate a work of fiction, or even a political work, but in attempting to render into another language a book in which every sentence has been thought out and weighed with, I might almost say, mathematical accuracy, the translator is face to face with the danger that a mere shadow of a word may introduce an important element of confusion. Style must, of necessity, often be sacrificed to the most literal, unchallengeable truth.

For the exactness of the translation I can offer the security of Mr. Chamberlain himself. He has taken the pains to read it through from Alpha to Omega. He has been so kind as to make many suggestions, and not a few emendations. I am therefore in a position to lay before the public a version of his work which has satisfied his critical judgment. His own introduction amply explains what has been his aim, and what are the means by which he has attempted to reach it. It was a happy inspiration which led him to test what he calls Kant's "style of thought," by comparing it critically with that of the five great Thinkers whose methods he analyses with all the learning and power of argument for which he is famous. The high praise with which this endeavour has been received by the literary world of Germany will, I hope, find an echo among the learned of his own country. Should it fail to do so it will be my fault and not his. One thing must be remembered. Mr. Chamberlain warns us over and over again that here is no exhaustive treatise upon Kant's philosophy. It is an introduction to the man himself. He, as it were, leads us to Kant, enables us to judge of his personality, to see how and why he has become such a power in the world of thought. He wishes to make us know Kant, and, knowing him, to love him as he loves him. No great Teacher ever had a more devoted disciple than Chamberlain is to Kant: even in the long years of illness under which he suffered, he tells us that he found in Kant a sympathy and a consolation.

Immanuel Kant as he shows him to us is a wonderful and an engaging personality—perhaps the sun in heaven never shone upon a stranger being than the Scottish-German Königsberg professor.

If under Chamberlain's guidance you penetrate into the great man's sanctum, you will find a small wizen man, hardly above a dwarf in stature, with sharp inquisitive features, and an eye that penetrates your very soul, and

seems to flood the whole room with light. His portrait by Döbler shows him dressed with scrupulous care. Be-ruffled and be-frilled, his appearance is that of an old French Marquis of the *Ceil-de-Bœuf*. Fine clothes are his one sacrifice to the Arts; he conceives it to be his duty to his visitors and to himself to appear to the best advantage. One feels inclined to wish that some of the modern men of learning would take a leaf out of his book, slovenliness and economy of soap being in his esteem no emblems of wisdom. He, on the contrary, is as well groomed as any Beau Brummell, and, great philosopher as he is, no *petit maître* was ever more delicately turned out. Such was the appearance of the man.

And his conversation! He has read every book of travel that he can lay his hand upon. His knowledge of the cities of Europe, especially of Italy, is so accurate that you would imagine that he had spent his life in travelling. An Englishman arrives in Königsberg and the conversation happens to turn upon Westminster Bridge. The Briton is at fault, but Kant sets him right with as great accuracy as if he had been the surveyor who took out the quantities for the builder. His delight is in works on anthropology, architecture, natural science, history. Don't presume to talk to him of philosophy! he will have none of it—nor does he seem even to have read the works of contemporary thinkers, save in the case of Fichte, where he was eager to show that the man had had the audacity to pretend that he based his philosophy upon him.

Little short of miraculous were Kant's grip and persistence. He was a mere boy when he chose "the lonely furrow" which he was to plough. During the eighty long years of his life he kept to the course which he had laid for himself. Never for an instant did he swerve to the right or to the left, and it was not until he was sixty years of age that he conceived himself to be sufficiently

equipped to face the public with his masterpiece. It must be allowed that this showed phenomenal determination.

As to his moral courage there can be no two opinions. He was the deadly foe of all that is false, of all superstition, of all dogma,—of all slavery. He preached the freedom of man,—the “freedom of freedom.” Religion he looked upon as the duty which man owes to himself, as “the recognition of all our duties as Divine Commands”; God is a moral necessity, something beyond comprehension: yet “that there is a God in nature” cannot be disputed. And this is the man whom churchmen have been apt to hold up to execration as irreligious!

His physical courage was no less than his moral courage. Fear was unknown to him. Upon one occasion a burglar broke in upon him. He had mistaken his man. In that puny body there was, to borrow an image from Eöthen, “the pluck of ten battalions.” Kant rushed upon the thief with the concentrated rage of a wounded tiger: the intruder was so taken aback by the sudden fury of the attack that he decamped, leaving the small philosopher master of the field.

What did the burglar expect to find in that simple home? It was bare of all ornament, for art did not appeal to Kant. Save only for the portrait of Rousseau his walls were callow; he looked upon pictures as mere witnesses of the vanity of those who hung them. His only gems were his thoughts, his wealth the rich mine of wisdom and reason, and it is to that treasure-house that Chamberlain lovingly and eloquently invites us here.

The translation of the notes is the work of Mr. Rudolf Blind. To him is due that important part of the book.

REDESDALE.

April 8, 1914.

ABBREVIATIONS IN REFERENCE TO KANT'S WORKS

- H** Allgemeine Naturgeschichte und Theorie des Himmel's.
General Natural History and Theory of Heaven.
- Tr.** Träume eines Geistersehers. Dreams of a Ghost-seer.
- D.** De mundi sensibilis et intelligibilis forma atque principiis. Of the form and principles of the world of the senses and the understanding.
- R.V.** Kritik der Reinen Vernunft. Critique of Pure Reason.
- P.** Prolegomena, etc.
- Gr.** Grundlegung der Metaphysik der Sitten. Foundation of the Metaphysics of Morals.
- M.N.** Metaphysische Gründe der Naturwissenschaft. Metaphysical foundations of Natural Science.
- P.V.** Kritik der Praktischen Vernunft. Critique of Practical Reason.
- Ur.** Kritik der Urtheilskraft. Critique of the power of Judgment.
- Rel.** Die Religion innerhalb der Grenzen der blossen Vernunft. Religion within the boundaries of mere Reason.
- Tu.** Metaphysische Anfangsgründe der Tugendlehre. Metaphysical Elementary foundations of the Doctrine of Virtue.
- A.** Anthropologie.

POSTHUMOUS

- F.** Über die Fortschritte der Metaphysik. On the progress of Metaphysics.
- Br.** Briefe. Letters.
- Ref.** Reflexionen Kant's zur Kritischen Philosophie. Reflections of Kant on Critical Philosophy.

- N.** Lose Blätter aus Kant's Nachlass. Loose leaves from Kant's remains.
- Üg.** Vom übergang von den Metaphysischen Anfangsgründen der Naturwissenschaft zur Physik. Of the passage of the Metaphysical beginnings of Natural Sciences to Physics. (The years 1882-3-4 of the "Altpreussische Monatsschrift" in which these unfinished last writings of Kant appeared as fragments, are designated as I, II, III.)

ABBREVIATIONS IN REFERENCE TO GOETHE'S WRITINGS

- W.A.** Weimar Edition.
- Br.** Briefe. (Letters).
- G.** Gespräche. (Conversations).
- D.W.** Dichtung und Wahrheit. (Fiction and Truth.)

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* All trace of this picture has been lost since 1835, when it was engraved for Knight's Portrait Gallery. It was then in the possession of Henry Dawe, the younger brother of the painter. Its whereabouts since then was not known to Dr. Hermann Rollett, author of "Die Goethe Bildnisse," Vienna, 1883.

A letter appeared in *The Times* of May 20, 1914, from the publisher asking for help to discover the original, and on the 21st the following letter appeared from Mr. William Roberts, the well-known art expert:—

To the Editor of "The Times."

Sir,—I think the following paragraph, which appeared in *Gil Blas* (Paris) on May 8, 1913, and which I find among my Goethe cuttings, will help Mr. John Lane towards tracing the portrait by George Dawe of Goethe, about which he inquired in *The Times* of yesterday:—

"Un portrait de Goethe, dont on cherchait vainement la trace depuis quatre-vingts ans, a été découvert récemment à Saint Pétersbourg, et vient d'être incorporé au Musée Goethe de Weimar, auquel un mécène de Hambourg l'a offert. Exécuté par George Dawe, artiste d'origine anglaise et peintre de la cour de Russie, ce portrait avait toujours été considéré par les Goethiens de marque comme le plus ressemblant parmi ceux qui nous ont transmis les traits du maître. Il a d'ailleurs été popularisé par une gravure de Th. Wright."

IMMANUEL KANT

INTRODUCTORY

I.—B

INTRODUCTORY

THE philosophy of Immanuel Kant arises out of the keenest dissection of the human intellect, and of its relation to surrounding nature: is it possible to place a clear conception of it before a lay public not previously prepared for its reception? Can a critical theory of recognition be set out in such a way as to be generally intelligible? I hardly think so. And yet the wish not to leave a man of Kant's importance to be the monopoly of a caste of the learned, but to make him a most precious possession of all cultured people, is so well justified, that it is beginning to spring up in many directions: already a number of good men and true have, each according to his own manner, kept this aim before them and done much valuable work. Kant had said that he was born too soon, and that a century must pass before his morning should arise. That day is now dawning. It is no mere coincidence that the first complete and accurate edition of the various writings and letters of Kant should have begun to appear in the year 1900; the new century needs the protection of this strong intellect, that was able to say of its own philosophy that it wrought a revolution in the method of thought analogous to that of Copernicus in physics. To-day there are some few who know, and many who suspect, that this philosophy is destined to form a main pillar of the culture of the future. Kant's method of thinking is a shield against the two opposite dangers—the dogmatism of priestcraft and the super-

INTRODUCTORY

stition of science ; at the same time it braces us for the self-sacrificing fulfilment of the duties of life.

Where a need is great and universally felt, there many have the right to lend a hand. Schiller's verses are, as is well known, applicable to " Kant and his commentators "—

How many beggars one rich man can feed !
When kings start building, carters find their work.

I too am a beggar. A beggar who from his youth up has sat at the rich table of the King of Thinkers. Till now it was my wont to sit at this table, untroubled by care : I was rather beggar than carter ; I fed my intellect, but did not bring myself into play. Never would the thought have entered my brain that what was to me an intimate event in my life might some day be turned to account for the benefit of others. In order that the reader may know exactly what has been my fixed goal in the following lectures, but may at the same time see what I do not aim at, I will first of all explain what have been my relations to Kant—for so I may call them—and then, in a few words, set out the special motive for their publication.

Kant's contemporaries are fond of dwelling upon his eye. One of them writes : " Kant's eye, out of which the deep look of his intellect shone forth veiled by a slight cloud, was, as it were, formed of the heavenly ether ; it is impossible to describe its bewitching glance." Another—a mere dry physician—says : " I cannot give myself free scope upon the subject of the intellectual significance of his beautiful, large blue eye. Revealing a pure inmost clearness, it was at the same time an expression of goodness of heart and kindness, and specially did it beam upwards when Kant at table, bowed down with thinking, would after a moment suddenly lift his head and address some one. It was as if a peaceful light, streaming

from him, spread itself over his words and illuminated all around it." That eye, formed out of the heavenly ether, that spread light over his words, his often obscure words, shone upon me the first time that I turned over the leaves of a book of Kant's. It may well be that I did not always understand his language: his eye I always understood; I honoured the philosopher, but the man stood still nearer to me; that Sage in whose eye a whole philosophy is reflected,—a philosophy to which it is impossible to give exhaustive expression in any scheme even were that scheme one of Kant's own devising, for the simple reason that it is far too unwonted, far too comprehensive and unfathomable, far too closely adapted to, and in harmony with, those riddles of life which can never be expressed in words. And so, as the years ran on, I became more and more intimate with Kant. His manner of thinking grew into me, or I into it. And here there was one distinguishing characteristic feature in Kant's method of thinking which exercised a special stimulus upon my mind, and lightened the task of accepting his thoughts. For Kant's books, however dry and stiff they may appear at first sight, are living creations. In him there is no flat faultless exposition of a neatly chiselled system which on a given day is laid before the world as a finished whole, but the passionate work of a genius whose life's task is the inmost organisation of his philosophy, a life's task with which he is busied night and day from early youth to advanced old age, fully conscious of its importance to the human race. He himself warns us in the most difficult of his works, the *Critique of Pure Reason*, to look upon it as "a document which runs on in freedom of speech," that is to say not to be too fussy about words, not to deal in learned hair-splittings. When in spite of this warning some new Editor, relying upon an extensive historical and critical collection of materials, undertakes to prove that the

different parts of this work were written at different times,—that Kant inserted new matter without having previously re-read that which went before and followed after—that he therefore repeated some things over and over again, leaving other things unsaid—that he was often faithless to his own definitions, or used different descriptions for the same circle of thoughts,—all these suspicions, many of which are certainly groundless, only go to show us that in this work we have before us something which was the result of living thought, growing day by day,—not something artificial and hide-bound,—and that it is based not upon words and definitions, but upon perceptions and convictions, and indeed upon perceptions and convictions which have all the more influence upon us in that they never freeze into numbness, but are viewed and described in one way to-day, in another to-morrow. “All that I wish is to be understood,” Kant said in reply to the first of the long list of his professional word-critics. It was thus that, in spite of his labyrinthine sentences, Kant became dear to me as a writer. He never occupies himself with learning, but with life: the metaphysics of the schools are to him a wilderness. It is on the contrary the idea of personality which makes us conscious of “the august character of our nature”; it is upon this, upon the liberation of man, upon the development of all the exalted qualities which lie hidden in his being, that Kant’s whole method of thought is directed. It was at his instigation that I arrived at not allowing myself to be deterred by those pedants “who tear single points out of their context,” and pick out “imaginary contradictions”; but as “mastering the idea as a whole.” That is the only thing that signifies,—the idea as a whole. It is this idea which at the outset drew my intellect to Kant. And what is this “idea as a whole,” if it be not the personality itself which shone forth from that “bewitching eye,” and is embodied here

in a philosophy? Goethe tells us that to busy himself with Kant acts upon him "like stepping into a brightly lighted room." With me that feeling has always been so vivid, that during long years of suffering, when all other reading was impossible, I could refresh myself with Kant. The mere contact with that intellect, purifies, braces, and heals. Every man who approaches him in the right spirit will feel the same.

Such, briefly told, are my personal experiences of Kant. But when a few years ago I was asked by friends, who had tried much and greatly failed, for advice as to how they should begin to make themselves familiar with the so much dreaded Kant, I was at the first blush puzzled as to what I should answer. There are, it is true, excellent books as introductions to Kant's critical world of thought, but they are to my thinking all marred by the same fault: they are technical, and on that account attack the subject from an abstract point of view. Now I am of opinion that Kant must be the common property of all cultured persons, and to that end we must make his personality, and not the scheme of his thoughts, and least of all a single work such as the *Pure Reason*, the central point of the exposition. The living force of all that which takes effect under the name of Kant, is the Man who lived at Königsberg from 1724 to 1804. And so I ended by recommending my friends to begin with the descriptions of his life, the old biographies by his contemporaries. To read Jachmann, Borowski, and Vasianski is to honour Kant and to love Kant: whoever has done that is on the right way towards understanding him, and that with an incalculable advantage which appears from the following consideration. Few indeed will be in a position to understand Kant in the sense that they can see over the vast horizon which he overlooked, or to follow him down into those depths which it was his peculiar, rare gift to fathom; if we approach

him from one single side we shall only see one portion of this philosophy, and that means a fraction,—something torn out,—essentially imperfect ; whereas on the contrary if we take our start from the centre of the living personality, we shall be in a position to draw a circle round this centre, wider or narrower in proportion to our gifts, and this circle, no matter how great may be its diameter, will be an organic whole. Only that which is harmony and all-round accomplishment can be called culture. It is not enough to make Kant accessible ; it must be done in such a fashion as will make him a real motive power in culture. It was this consideration that led me to the question whether it might not be possible and useful to extend the narrowly bounded circle drawn by those lovingly descriptive biographies. No systematic and collective setting out of his life's work, such as the professional schoolmen have attempted with more or less good fortune,—still less a searching analysis and display of single writings and series of thoughts ; but a survey of Kant's personality from the purely human standpoint. What the day brings quickly fades from our sight, overwhelmed by the unceasingly rising piles of the desert Sand of Time : in spite of that the fleeting experience leaves behind it in faithful memories the impression of something which is everlasting, because it can never come back : that is the memory of the indivisible, of the incomparable, of the man.

Every man is in his place immortal.

However, since all repetition is a crime, and since the biographies have told us all that is necessary about Kant's course of life, his disposition, and his habits, it was clear that this attempt at an interpretation must be confined to his intellectual personality. Not the crooked, zigzag line of a human destiny, but the immovable inmost soul of the given being,—not the thoughts of the

thinker, but the way in which he arrived at thinking those thoughts: that was what it must be my aim to grasp. A system of philosophy is from the outset fixed by the construction of the personality. Education and the influences of life, among which the mother-tongue asserts itself as the most active and despotic factor in thought, only occupy the second place in our attention in so far as they are responsible for giving form. But in what way are we to set about portraying a personality? In my first lecture I have established the conviction that comparison alone can lead us to our goal. If I compare great thinkers, which always means great Seers, with one another,—a Kant, a Goethe, a Plato, a Descartes,—enquiring less as to *what* they saw than as to *how* they saw it, I soon discover how exactly the organic quality of their mental machinery and of their intellectual aptitude conditions their philosophy: at the same time the comparison teaches me to form a sharp and living estimate of the peculiarities of each. The work of comparison must always proceed from the eye. We can only judge men when we see them at work; yet, by following this road we soon unconsciously reach the domain of metaphysics, even down to the discussion of fundamental definitions and the like. And so we suddenly discover that we have been not insignificantly helped in our task, and that too in a more wholesome fashion than through attempts at courting popularity. We cannot drag a man like Kant down to our level. The rather should we follow the roots of his idiosyncrasy in various directions, seeking for points of contact with phenomena that are more familiar to us, and in this way by degrees strive to work our way up to him.

Such are the impulses and the considerations to which the present work owes its inception and its peculiar form. In the first instance I dealt only with lectures hastily thrown off, intended only for a most limited

circle : even in the more closely worked up state, this characteristic of unfettered living conversational talk, has been preserved in spite of its far more extended sphere. The lectures were destined for friends, and even now that they have to face a wider circulation, they are addressed only to sympathetic intellects. It is a layman who is speaking to laymen. His object is far less that of teaching than that of pointing the road to learning. His ambition is to stimulate, to arouse, to inspire enthusiasm : he desires to reveal lines of thought, to shed light and lucidity, to give men confidence in their own power. So soon as the reader shall have reached the field of attraction of the great master he will no longer need this friendly hand. Until he reaches it, while he is yet on the road, let him not be too proud to accept its help.

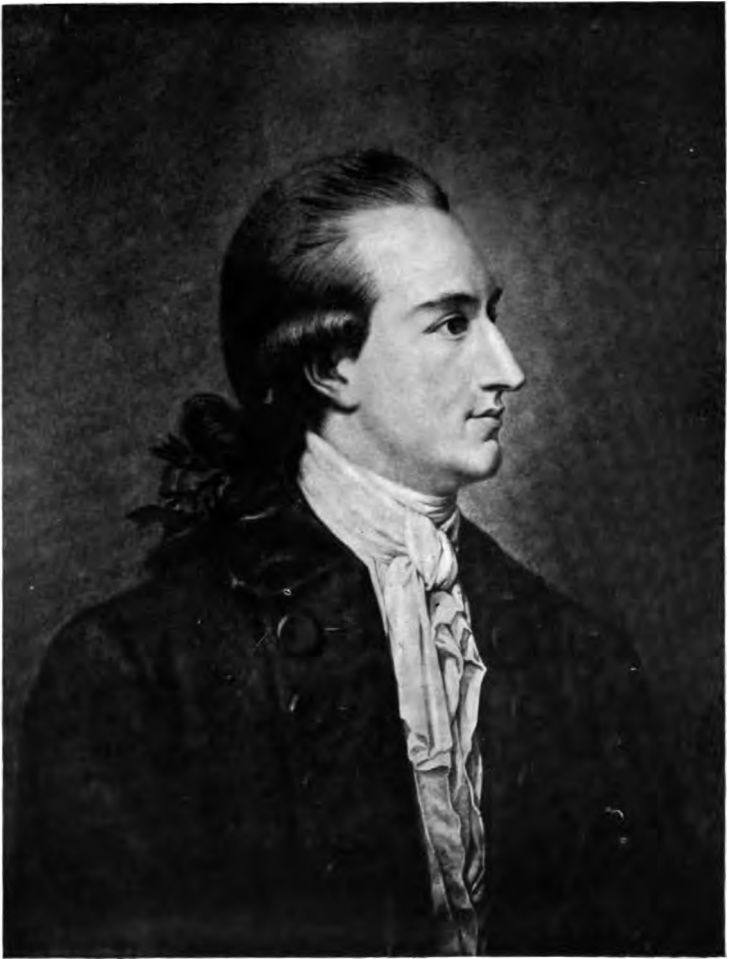
GOETHE
IDEA AND EXPERIENCE
WITH AN EXCURSUS ON THE DOCTRINE
OF METAMORPHOSIS

**Where object and subject touch
one another—there is life.**
Goethe.

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TO THE
LIBRARY OF



GOETHE AS A YOUNG MAN
From an engraving after Georg Oswald May (1779)

GOETHE

THE manner in which a man looks upon the problems of life and of the world, in other words his philosophy, is born with him; it is the necessary result of his way of "seeing."

We may admit that the limits of the peculiar form in which he gradually works out this inborn quality of his into a more and more perfected embodiment, and first becomes conscious of its possession, arise like a network of diagonal lines out of his own original self, under the influence of the workings of his time and his surroundings; still, at the root of all is the personality.

The development of the soul is like that of the body: encouragements and hindrances crop up, asserting their power at every step; nor can we afford to lose sight of the following considerations. If in the life's work of a great thinker we are content to compare the doctrines and the systematic construction in his labours at different stages of his existence, or to collect utterances and opinions upon any special question drawn from every nook and corner of the overflowing intellectual treasure-house of genius, we shall easily bring to light a whole chaos of contradictions. There is no great cleverness in that. It is the way in which to create the impression of uncertainty and unreality; the consistency of the thinker's philosophy is apparently destroyed. If, however, we look more closely, we shall face these uncertain wavering utterances of the thinking brain with special attention, inasmuch as it is just in these inconsistencies

that the fight of the one man defending his own against the surrounding world of prejudice is revealed, and in no other way can the special and distinguishing features of the individual be laid bare. This is conspicuously seen in Kant, for in his case it is not, as in that of Schopenhauer, for instance, the uniformity of a systematic method of thinking which gives consistency to his work in the field of philosophy, but the practical combination in one living personality of very different, indeed almost contradictory, intellectual faculties. I think, therefore, that you will penetrate into Kant's work with greater ease and surety, if in the first place you become familiar with the rich world of his personality.

Men who wish to become acquainted with the philosophy of Immanuel Kant are apt to plunge with all the boldness of insanity into that most difficult of all the works of the world's literature, the *Critique of Pure Reason*; most of them soon lose courage, and end by contenting themselves with reading the chapter on Kant in some history of philosophy. I would urge you to follow me on a different road. I would urge you, before venturing upon the study of any of Kant's various writings, and before attempting to assign to this rare man any place in history, to learn to appreciate those essential features of his intellectual existence which differentiate him from all other thinkers, and so to become familiar with his life's work. I am not looking so much to the outward aspects of his personality as to his intellectual faculties, considering them, so far as may be, apart from the accidental conditions of time and space. History is apt to blind us to that which is eternal. The details of Kant's life, his fate here upon earth, are accessible to you from all manner of books. For a knowledge of his character I would refer you to the three little sketches by his contemporaries, Borowski, Jachmann, and Vasianski.¹ His philosophical teaching is

dealt with in thousands of books and essays in all the languages of Europe.³ Naturally we too must draw upon these various sources ; but we shall not dwell too much upon them, for our object lies in another direction. It must be our aim to ascertain what was the original nature of Kant's intellect ; how he looked out upon the world ; how he worked up in his soul the impressions which he received ; in what manner he was bound to think. We wish to know what intellectual materials he assimilated, and what he rejected ; what were the intellectual achievements for which he was specially qualified, for what on the other hand he had little aptitude or none. We wish to investigate the motive powers which gradually impelled him to devote himself to the most abstract thinking, and which gave him the perseverance necessary for his herculean labours. Above all, we shall endeavour, silently and attentively, to keep watch while he thinks, so that by practical appreciation we may become acquainted, if not with the artistic whole of his finished thought-structure, at any rate with the special features of the world in which he lived and worked according to the dictates of his natures. In short, we desire to investigate the individuality of the Thinker, the qualities of his intellectual personality. That will without doubt result in our arriving at the distinguishing peculiarity of his work, at any rate in its larger and more general features, and that will lay the foundation for further study hereafter.

How can such a task be accomplished ? To my mind there is but one way, that of comparison. "*Nous ne pouvons acquérir de connaissances que par la voie de la comparaison,*" says Buffon, the great naturalist.³ For a theoretical description presupposes a whole series of definitions, and in the face of life all definitions shrivel up into figures of speech. Except in the case of mathematics and logic, in which definitions deal with the formal

aspect of universally accepted schemes of perception and comprehension, all attempts at defining rest upon the fundamental disregard of the single individual ; for example, in Zoology or Botany we define a species, whilst we are only calling attention to that which is common to the different individuals, whereas the peculiarity of the single individual, even of its outer form, is made up of a hundred features, which defy all verbal description. There is no such thing as a "science" of the individual. And this holds good if instead of the outward and visible form we take into consideration the invisible inner nature. In such cases, on the contrary, generalities mean little or nothing and, unless we are guided by ample and very exact perception, are almost always misleading. If, for instance, I read that "the predominance of abstract thought over concrete thought is characteristic of Kant," how am I the richer? I have only gained a phrase which may be indisputable, but is yet no more than a phrase, and indisputable only in so far as it contains nothing but a nebulous generality. No one can think without perceiving, and no one can perceive unless he can form ideas. We shall see presently that Kant's intellect possessed a peculiar power of perception, whereas many of the so-called intuitive thinkers, that is to say men who devote themselves rather to ocular perception, like Goethe for example, continually mix up utterly unimaginable thoughts with their so-called intuition. We cannot hope to arrive at a conception of the individuality of an intellect by mere verbal portraiture. This would give us at most but a flat picture, whereas I am penetrated with the desire to furnish you with a perfect plastic representation. Comparison alone can serve us to this end. We are apt to undervalue the intellectual differences between man and man; they are immense, not only in respect of *plus* and *minus*, but also in respect of the "how" in men of equal importance.

Here we shall find that Nature has prescribed to the thinking of each individual limits from which there is no escape, a matter to which we shall call attention in a future lecture. It follows that if we choose the right men for the purpose of our comparison, the strong shadows cast by these models will bring the picture of Kant's mind,—the peculiar characteristics of his world of thought,—more and more into relief.

The first important consideration is, whom should we choose for our models? I do not propose to start by justifying my choice; its worth must prove itself. One thing only I will say, which is that I cannot endorse the views of the average modern German who in the *Philosopher* sees no more than a species of the genus Professor. We need not undervalue the meritorious activities of the expert, especially in the investigation and exposition of the history of human thought, and in the education of our sons; and yet we have a right to require that some distinction should be drawn between professional knowledge and genius. Kant himself lays stress upon this.⁴ We do not bestow the title of artist upon a man who is a professor of the history and theory of art; nor do we for an instant compare him with those divinely favoured men, whose work has given birth to the material for a science of art. We should make the same distinction here. "Pure Philosophy is a product of Genius," says Kant, and Goethe repeats the same in his own fashion.

Is it only the poet that is born? The philosopher is born no less.
Truth can after all only be seen when brought into form.

All that we consciously perceive, all our ideas concerning intellectual and moral entities, all our pictures of the world at our feet and of the cosmic universe, come to us as the inventions of single supreme intellects. An image conveying the sense of the unseen; a thought

which gives intelligible shape to that which is seen,—a combination of a series of disjointed phenomena into one connected whole,—are just as much a work of creation as an epic or tone-poem.⁵ The mere expression of such a thought is not sufficient to give it life and enable it to bear fruit; it must at the very outset possess certain potentialities with which genius alone can endow it; it must be “brought into form,” otherwise it could not be perceived. These are matters which we are apt to forget in the indolent enjoyment of what has become an hereditary intellectual property. It is little by little that our store of ideas, “rendering possible this system of philosophy,” has grown rich, but the process has been very slow. Up to the present time thoughts capable of illuminating have been few and far between; and the incitements to new thoughts and new surveys of the world have for the most part arisen not out of philosophy, but out of the progress made in natural science and mathematics, or out of absorption in religious sentiment. That may possibly be the reason why, of the thinkers who have made epoch in the world, hardly one has been a philosopher by profession, and why the world has no reason to congratulate itself upon the period when in the nineteenth century the “pure philosophers” ruled almost alone.⁶ Even Kant started his career as a savant not with philosophy, but with mathematics, physics, and theoretical astronomy. He was originally professor of mathematics, and owed his chair of philosophy not to the wisdom of the university authorities, but to the accident that his colleague who occupied that chair was desirous of an exchange of duties. Even in his ripest old age Kant preferred to read about anthropology, geography, physics, mathematics, and the science of fortification; whereas he never once lectured upon his own metaphysical doctrine. He was led to his investigations of the whole range of the human intellect by the

necessity of securing an indestructible foundation for practical philosophy, that is to say "the method of educating and ruling mankind" (*Letters*, I, 138),—and for exact natural science. In the letter which I have just quoted he says, with a sigh, "I shall be glad when I shall have brought my transcendental philosophy to a conclusion." Here there is one more reflection to be made. Logic and dialectics, which together with history make up, and properly so, the main subject of so-called "philosophical" education, have no significance beyond that of a discipline. It is impossible, in spite of all attempts, to compare them with mathematics,—for mathematics, at any rate geometry, which is their only constructive branch, are perception, and even though this perception be subject to certain limitations, it still, being perception, leads us on further and further; its growth knows no end, and its interchange of relations with all sciences is endowed with perpetual life and newness. Logic, on the contrary, is nothing but a school of method. We may admit that that is no small matter, but what we must learn to recognise here is the fact that a knowledge of logic, like reading, writing, and arithmetic, can at most only indirectly contribute to the building up of a system of philosophy. Logic is like a mill, a mill incapable of extension, but in the use of which we can, by practice, to a certain limited extent perfect ourselves. A mill, however, is of no use unless there be grist to grind, and this grist is no produce of the stark, lifeless millstones, but grows out in the open, germinating in the dark mystery of the earth, coaxed into life by the burning rays of the far distant sun.

This is why, in our wish to compare other men with Kant, we shall lay no stress upon their belonging, or not belonging, to any special guild of learning; it is its area, its illuminating power, its creative fullness, and its organic consistency which lend value to a system of

philosophy. It is for that reason that in a former work* I have proposed to draw upon the wealth of the German language in order to distinguish between "philosophy" and the German word "*Weltanschauung*." The word philosophy, borrowed from the Greek, must always bear the meaning of a learned or scholastic discipline. The German word implies a predisposition allied to religion and mythology, altogether human, but developed in all manner of different directions, with a network of roots nourished by art and science, by philosophy and mathematics, a tendency the foremost aim of which is to establish a harmony between the outer eye and the inner eye, or should this figure of speech be too bold, between seeing and thinking and conduct.† If, then, we should press into our service the words philosopher and *Weltanschauer*,‡ drawing the same distinction as we have done between philosophy and *Weltanschauung*, we should know exactly what manner of men to select for the purpose of comparison. Not every philosopher has been a *Weltanschauer*, and the great *Weltanschauer*s have been poets, painters, statesmen, physicians, priests, mathematicians, historians,—now and again also, philosophers.

For reasons which will by and by reveal themselves, and which I venture to hope will be justified, I have chosen for the purpose of comparison, the following five men : Goethe, Leonardo da Vinci, René Descartes, Giordano Bruno, Plato. I shall devote a lecture to each of these, not indeed with the object of giving a complete account of their several systems of philosophy, but in order to analyse the method of each one, and to contrast it with that of Kant. As a matter of course, Kant must be the first consideration throughout ; a sixth lecture must

* *The Foundations of the Nineteenth Century*, German Edition, p. 736.

† A man who observes or contemplates the systems of the universe, moral and physical.

be given up entirely to him, while the results of the previous lectures will be turned to account and summarised in its interests.

Much might be added as to the plan which I have in view, but I think that for the present the above indications will be sufficient. The names of Goethe, Leonardo, Descartes, Bruno, and Plato are known to everybody; they are all that is necessary as a first guide on the road over which I hope to travel in your company. I do not wish to tie myself down to any tedious hard-and-fast scheme, but propose to deal with the subject-matter in each lecture just as the instinct of the moment may suggest. The man who pursues some living thing is a hunter; all his senses must be on the alert, he must know when to wait and when to strike. There shall be no ostentation of learning, nothing at any rate which might in the professional sense be called learning. I am but a layman who is addressing laymen. We will not quibble about words, we will only keep our eyes open for an unprejudiced observation of that which is obvious to every man who takes the trouble to watch. Kant himself, in his severe way, says, "Subtle errors have an attraction for self-conceit which delights in the consciousness of its own strength, whereas obvious truths, on the contrary, are easily grasped by common sense."⁸ That which is best is the common inheritance of us all; for, as the Bible points out, God has given us eyes that we may see. Besides this our aim shows us the road which we must follow, and in kindly fashion limits our task. We cannot even make an attempt at anything like completeness, save only in the perfect plasticity of every conception at which we arrive. We shall make it a principle to avoid busying ourselves with any particular thought until we are equipped with a sufficient material for perception; on the other hand, as soon as we have a clear sight of such a thing, we shall spare no time, but turn the subject

over and over again, until we have investigated it through and through. In order to furnish such subject-matter as may be indispensable to perception, I shall in each lecture introduce an excursus which, though it may appear to lead us away from the subject, will in reality help us to grasp it. "How," says Kant, "can we gain sense and significance for our conceptions, unless we supply them with some form of perception, which must be an example drawn from a possible experience?"⁹

In these lectures I do not aim at an interpretation of Kant's theoretical teaching; what I look to is perhaps more limited, but certainly more difficult; my object is nothing less than to draw near to Kant,—to enter his actual presence. The worst fault in the civilisation by which we are surrounded, is that it paralyses the intellect. Our obligatory school curriculum and the pressure on all sides that cramps us on leaving school, forcing us into definite paths, acts as a stencil on our method of thought; the press does the rest; under its fateful gorgon-glance every feeble attempt at independence is nipped in the bud. Without the power of motion there can be no such thing as understanding. When Kant says, "we only understand that which we do ourselves," he of course means his dictum to be applied as a criticism of recognition, and is referring to the human intellect in general; but it is a saying which is applicable to all understanding. In order really to understand a given personality in the methods of perception which are peculiar to it,—not merely entering into arguments as to the doctrines which are the result of that perception,—we need the faculty of imitating its special methods, its predilections, tricks and knacks, in short, of working and constructing, as it is wont to do itself. Kant often asserts that outward imitation leads to inward sympathy; for instance, if you always answer a sulky young girl with a friendly smile, by degrees she will be converted to amiability!¹⁰

A joke that is full of the deepest sense. If Kant is as a rule little understood, if his writings are considered too difficult, it is above all because his personality in its intellectual peculiarity is utterly unknown. We, however, are apt not to trouble ourselves about that, but must needs go straight ahead, deluding ourselves with the idea that out of a series of words strung together, we can simply and without more ado become acquainted with his perceptions. That could only be the case if Kant had nothing new to tell us. The meaning of a word, apart from the hard-and-fast stencil of it, is always fluctuating. A word is no coin representing an equal value as it is passed from hand to hand. On the contrary, the word grows with the man who utters it ; it may be broad or narrow, definite or indefinite, rich or poor, brilliant or colourless, according to the intellect whose servant it is ; it travels in space so that the range of ideas which the same word reaches is often quite unequal in various persons,—ideas sometimes hardly intersecting one another. How specially is this the case with a Kant ambitious of effecting a Copernican revolution ! And yet that very upheaval must be carried out with the old words ; how otherwise would he make himself understood ? But how are we to give a right value to the old words if they carry a new meaning ? There is no royal road out of this dilemma, for we can only understand a man's thoughts from his words, and his words from his thoughts. And so it may be justifiable to attempt the paradox of setting the conception before the doctrine, and to represent the personality out of its work, not in its work,—justifiable not as a universal method, and yet as one among many methods.

One last remark and I shall have brought these introductory considerations to a close.

The road on which I hope to act as your guide will not lead to a knowledge of learned and professional philosophy. What I have already said is enough to show that ; still,

I am bound to insist upon this fact clearly, expressly, and once for all. In order to grasp what lies at the root of an individual's peculiar way of thinking, more mobility and dexterity of mind are required than what the professional philosopher can claim, or even allow, when exposing his abstract system ; but, of course, this mobility has to submit to special limitations ; we cannot study personality and systematic philosophy at one and the same time. As Goethe says in a famous sonnet, " not only does the master mind reveal itself in its very limitations," but, as we see in every form of life, whatever is " masterly " arises only within such limitations. When we burst the barriers we wreck the form. We shall often have to allude to philosophical theorems in these lectures ; but it is not the theorems but the personalities of the thinkers that are the centre of interest ; there it is that we shall find the informing law. Put this idea into a formula and it would run,—it is not the thoughts that count, but the method of thinking out of which those thoughts proceed. Thinking, however, is revealed in thought, and thus it is clear that the material with which we have to deal is in the main the same as that which has been worked up by professional philosophy ; for long distances we shall have to travel close along the frontier, and shall have before our eyes the same boundary stones as the professional philosophers. But we shall take our survey from a different point of the compass from theirs, and so see in another light and in another perspective. The same thought will assume a different form. That is what you must never forget, otherwise you will be expecting from me something outside of the scope of my undertaking, and will feel disappointed when you find that a laborious study of the works of the learned still lies before you ; at the same time you might easily undervalue the significance of my attempts. Against both of these ideas I enter my protest.

To-day, then, we shall speak of Goethe, that is to say, we shall compare Goethe's method of seeing and of treating what he sees, with that of Kant.

Goethe himself challenges the parallel. After praising Kant in a conversation with Eckermann as the "most pre-eminent of all philosophers," and declaring that Kant's thoughts had penetrated German culture to such a depth, that from that time forth even those who had never read him could by no possibility escape from his influence, he makes the following remarkable observation: "Instinctively I followed the same road as Kant." It is well that we should have this upon the authority of Goethe himself, otherwise I should run the risk of being accused of hairbrained paradox, if not of the audacity of a dilettante, for daring to claim relationship to one another for two such opposites. But Goethe was a man every one of whose words might be weighed in a goldsmith's scales; so when he says, "I instinctively followed the same road as Kant," he is making a clear, distinct, and decisive statement, which no one can pass by unheeded. In talking with Eckermann Goethe certainly thought it unnecessary to bring forward any deep reason for what he said, but confined himself to a few cursory explanations of little value—for Eckermann was but meagrely equipped in philosophy, and at that time was generally unacquainted with Kant's writings. On the other hand, we possess elsewhere in Goethe's works ample justification of this remarkable statement, more especially in the precious series of short essays, *Einwirkung der neueren Philosophie, Anschauende Urteilkraft, Bedenken und Ergebung*, and in many other places. But even if we were not in possession of these documents, I would pledge myself to show, from the life's work of the two men, the meaning of the words, "I followed the same road as Kant."

Any detailed account of the influence of Kant upon

Goethe's method of thought would be out of place here. Without embarking upon history, our only desire is to lay stress upon the fact of the close relationship between the two. In regard to this a remark of Goethe's own is of importance: "It is by no means a matter of indifference at what period of life we come under the influence of a strange personality; that it was upon my mature age that Kant made his influence felt had a deep significance for me." It is easy to see what he means if we compare the rest of his utterances about Kant. Had they been received prematurely the germs of such a searching analysis of thought, the mature work of a man who was, as it were, born fully mature, would have threatened the independence of Goethe's power of perception; as it happened, Kant entered his horizon of thought at the psychological moment, and gave him, as Schiller did, something which he had not possessed up to that time, although it must have lain dormant within him. "For the first time," says Goethe of his maiden attempt to penetrate the *Critique of Pure Reason*, "a theory seemed to smile upon me."¹¹ And yet this work was but little fitted to serve a Goethe as an introduction to an appreciation of Kant. The real intimacy only began with the *Critique of the Power of Judgment*, of which Goethe said that he was indebted to it for "a most happy epoch in his life." In Goethe's mouth the word "epoch" is worthy of note. For the full ripeness of Goethe's existence, comprising the last forty years of his life, remained under the influence of Kant, or to put it better, Goethe's philosophy from that time forth stood in reciprocal sympathy with that of Kant.¹² In March, 1791, Goethe was already deep in Kant's writings; for the Goethe archives contain a notebook of that date with extracts all in Goethe's handwriting. Not long afterwards came the decisive influence of the intimacy with Kant's most talented disciple,—Schiller. Goethe himself bears witness,—"over and over

again I returned to Kant's teaching . . . and gained much for my everyday use." For in the meanwhile he had once more taken up the *Critique of Pure Reason*, and he had succeeded, as he tells us, in "penetrating more deeply into it," and that indeed because he had recognised that it was impossible to estimate Kant's philosophy by means of that fragment of it which is contained in the *Critique of Reason*, but that his different works, "all the children of one brain, are continually interdependent." It is no matter of wonder, then, that the old man who had grown so anxiously scrupulous in the use of his predicates, should love to speak of Kant in superlatives. So in 1825 he writes of "our glorious Kant," and in 1830 of the "boundless gratitude which the aged Kant has earned for himself of the world and, I may add, of myself."¹³ And six months before his death he says emphatically of Kant's philosophy, "it made me watch over myself—an enormous point gained."¹⁴

Though this historical connection is only interesting parenthetically, I have thought well to say so much briefly as a general guide to the understanding of a relation which almost all Goethe's biographers have deliberately left unnoticed.¹⁵ Let us now without further delay turn our attention to the living personality.

A page or two back I alluded to the allusion in the Bible as to the gift of eyes that we may see. If ever a man was gifted with eyes that he might see it was Goethe. Just as the heart is the living centre of our body, from which all the blood ebbs and to which it flows again, so is the eye the centre of Goethe's intellectual life; he says himself, "The eye has been the organ above all others with which I have grasped the world" (*Wahrheit und Dichtung*, Book 6). Almost all the decisive impressions of his life are received through the eye: in order to love Schiller he must see him. His eye is an organ which there is no satisfying, and what it has seen

it retains, changing it into flesh and blood and bones. "I am just one of those Ephesian goldsmiths, who pass their whole lives in watching and wondering and adoring the marvellous temple of the Goddess, and in copying her mysterious forms." Thus spoke Goethe as a man of sixty-three,¹⁶ and herein lies the secret of the wonderful phenomenon that Goethe never ceases to grow, that even as an old man with every returning spring, like a venerable oak tree, he puts forth leaves as fresh and green and young as a sapling in its first year. The process of nourishment never ceases. It is the eye which establishes the connection between the individual and nature: the other senses take a second place: the intellect on the other hand—whether it be a simple ganglion in the first segment of the earthworm, or a powerfully developed brain-substance inclosed in the hard skull, is always lying hidden in unattainable depths, separated from the world, a born egotist. The eye is the bridge. What would be the use of this bridge—the eye—unless somewhere in the darkness of the fortress there were a king waiting for his guests, a magic-working king, transforming all things at his pleasure, ordering all things in the manifold boundlessness of nature after a human standard, and out of the world of law and insensibility fashioning a world of Freedom and the soul? Manifestly, however, it must make a great difference whether an individual throws the weight of his activity inwards or outwards, whether he is contented with as few impressions as possible from without, and takes his delight in working these up, or whether he stands night and day on the watch, seeking to enrich himself with new and yet newer treasures of thought. The words of his own watchman, Lynceus, are in the fullest sense applicable to Goethe—"Born to see, trained to perceive." Indeed these words carry a double meaning. His eyes were "born" with the gracious gift of seeing, but they were

beyond that systematically and strictly "trained" from his youth up. Goethe's intellectual development might be described as a conscious and self-imposed consummation of the power of sight. Here we have a process of will running parallel with the law of nature in regard to the progressive advance of age. In youth it is the artistic sight of the soul which is dominant. "The world around me and heaven rest in my soul like the image of the beloved."¹⁷ Later on it is the method of perception of the maturing man which comes to the front, observing incessantly, enquiring, comparing, seeking to understand nature in her being and in her processes; when he nears his sixtieth year Goethe confesses, "Though it was a pain to me at first, I had at last to think myself lucky that while the artistic sense was threatening gradually to leave me, the scientific sense developed itself with more and more force in eye and mind,"¹⁸ and while thus the watchman's eye was adapting itself with instructive wisdom to the changes wrought by years, the magician-like, working in secret, was in harmony with him, forming new conceptions out of new impressions. Thus, for example, we see Goethe's religion lifting itself out of the fanatic mysticism of his youth,—when the only reproach which he could find against the Roman Catholic faith was that it did not recognise a sufficient number of sacraments,—to the stern loftiness of his religion of the four venerations with their mystic symbolism and simple worship of nature. Here again in his inmost soul he mirrors what his eye has seen.

It would be carrying owls to Athens were I to attempt by examples to prove to a German audience the predominant part played by the eye in Goethe's life. In this respect his poems speak for themselves, and need no commentary: his scientific discoveries—the intermaxillary bone, the law of antagonism in colours, etc.—are all the practical outcome of his power of sight: his

contributions to natural science—his doctrine of metamorphosis, and his studies in optics, are in reality not scientific theories, but anti-theoretic expositions of facts actually observed. To see! to see! to see! was the law of each succeeding day. "Goethe sees at every pore," says Emerson. His duties and labours were indeed manifold. From inspector of mines, examiner of accounts, and philologist, to theatrical manager, newspaper editor, and experimentalist in physics, he was pretty well everything that a man can be, and under the pressure of business one thing after another was apt to fade out of his horizon,—even poetry was often laid aside. But to one thing Goethe remained faithful during almost every day of his long and rich life, and that thing was devotion to architecture, sculpture, and painting. However much he might be engaged in enriching the store of what he had seen with his eyes,—from the observation of the earth's crust, and the revelations of the deepest shafts sunk into its bowels, to the watching of cloud forms and the play of colour between light and shade,—however busy he might be in adding to his knowledge by studies in anatomical museums, by microscopical and telescopical work, by experiments in optics, and much more besides,—there was hardly a day in Goethe's life when he was not, in addition to all this, actively and systematically at work, studying sketches, engravings, paintings, numismatics, plans, and elevations of architecturally important buildings, or painting and drawing with his own hand,—and, when he was on his travels, visiting monuments, galleries, collections, and the like. This was the passion of his first youth, and when he was actually dying, he spoke of pencil sketches of which, in his delusion, he believed himself to be turning over the leaves. In him, then, the exercise of the eye was not merely passive, but uninterruptedly active and creative. Of the significance of this in forming an opinion of the

great thinker Goethe you will be able to judge from words which he wrote as early as his twentieth year. "How certain and how enlightening to me has been the strange and almost incomprehensible aphorism that the studio of a great artist does more for the development of the philosopher in embryo and the poet than the lecture room of the worldly-wise and the critic" (*Letters*, 9, II, 68), and so "through art to wisdom" was Goethe's motto. In his case the philosopher and the poet walked hand in hand: they were not contradictions, but two sides of his character, each the complement of the other.

Here we have the important point, for in it lies the whole essence of the contrast with Kant, and if we rightly grasp its significance we shall be able to realise many other points of contrast in the mental portrait which we form to ourselves of the two men. For instance, the constant living flow of development, to which I have called attention, is a necessary result of the predominant power of the eye. The eye can seize no more than what is present before it. The man who surrenders himself entirely to its influence, will always be passionately attached to the immediate impression which is partly conveyed by the object itself, and partly by the capricious nature of his own eye. Kant, as you will presently see, guards himself mistrustfully against any such influence,—he shuts his eye: Goethe on the contrary does homage to the "almost incomprehensible aphorism" that the philosopher can only rise up like the grass-haulm under the sunbeam of the open eye.

The most generally known example of the capricious impressionability of Goethe's eye is his attitude towards Gothic art. Brought up from childhood in the belief that Gothic and want of taste were synonymous, as a young man he shudders at the very thought of Strasburg Cathedral, "at the sight of a monstrosity all twists and curls."¹⁹ He goes there and, standing before it, finds

“the work to be so sublime that he can only bow his head in adoration.” Every German knows the glorious first sheet in Goethe’s work on German architecture, dated 1772, in which he apostrophises the creator of the Cathedral: “Thanks to thy teaching, thou genius, thy depths no longer make me giddy. Into my soul there falls a drop of the blissful repose of the spirit that can look down upon such a creation below, and, like God, declare that ‘it is good.’” But Goethe left Strasburg, and it so chanced that for many years he had no opportunity of seeing any important specimens of Gothic work:²⁰ he himself tells us, “the impression died out, and I hardly remembered the conditions in which such a sight awoke in me the liveliest enthusiasm.”²¹ The eye seems to be incapable of memory, and even though Goethe like every true genius was gifted with a marvellous memory, no lingering remembrance could be expected to hold its own against the living impression of the moment in an individual with such extraordinarily artistic faculties; so he renounces his earlier faith, and will have no more to say to “the sturdy, coarse, German soul,” which inspired his first artist-hymn, nor to the “most wood-cut of all figures,” of “the manly Albrecht Dürer” which he once loved; for like the German kings of old, he too had crossed the Alps, and had been caught into the toils of foreign beauty. When he had been no more than ten days in Venice, and had become intoxicated with new artistic impressions, he wrote of Gothic art, “Thank Heaven I am quit of that for ever!”²² But that was not to be the last word. Goethe was some sixty years old when his acquaintance with the brothers Boisserée induced him once more to interest himself in Gothic architecture, and not in architecture alone, but also in Dutch and old German painting. Goethe dived deeply into the study of the paintings of the Van Eycks and Lucas Cranach, and wrote about them with fine warmth.²³ In talking of

the drawings of Albrecht Dürer he apologises for the fact that his criticism "is nothing but a web of praise," by saying that it "will be long before either he or his readers will again meet with such a justification for praise."²⁴ Once more he takes the pilgrim's staff in hand, this time not in order to expatiate upon the "divine genius" of Palladio in the city of lagoons, but in order, by visiting the cathedrals of Strasburg and Cologne, to fan into new flames the old fire of his youthful enthusiasm for German architecture.²⁵ He finds himself, as he tells us, quite at home again in the surroundings of early years, and truly rejoices in "the youthful pamphlet in which he had undertaken to utter the unutterable."²⁶ Above all he never lost his interest in that "projected world's wonder," Cologne Cathedral. With the help of etchings, plans, and pictures, the living work arose before his eyes as it would one day be, and over and over again he cast his weighty vote in favour of the completion of a building which he now judged to be "the most excellent and noblest work that perhaps ever was built upon earth with a consistent appreciation of art."²⁷

Heaven forbid that we should see in this fickleness, as some commentators do, the influence of æsthetic theories. They are beside the question. The real foundation of the inconsistency lies in the domination of the momentary impression made upon an individual endowed with an unusually sensitive eye. It is with this sensitiveness that one whole side of Goethe's intellect is connected, and it is of this that he himself says, "with my character and my habit of thought a new opinion has always swallowed up and pushed aside those that had preceded it" (D.W. 15). In art as well as in all subjects to which Goethe directed his attention, if we compare all his sayings, we shall find an almost superhuman honesty of judgment which proceeds from the clearness of his vision. On the other hand, in almost every utterance of his, taken by

itself, the careful reader will see how passionate admiration of one thing goes hand in hand with detestation of its rivals, even in his later days, when he had long since become a master of the art of self-control and of concealment of his inmost being.

Without going into detail we have now examined this question fairly at length, and that must suffice for the present. At most I should like to add, for fear of any misunderstanding, that when I speak of "the eye" alone, I include the whole sensitive faculty. The ridiculous tale of an unmusical Goethe, the invention of certain none too gifted philologists, is contradicted by hundreds of the most profound observations upon the essence of music in Goethe's writings: it is refuted by his friendship with Zelter, and by the living interest which during thirty years he took in the musical work of that friend, and in his labours on behalf of the furtherance of music: it is refuted by his intercourse with musicians at all times, but above all by his noble poem on "the divine value of sound," and by the admission that the "gigantic power of music unfolds his heart as a clenched fist is unfolded in friendship,"²⁸ and when, fifty years before Richard Wagner, this Prince among poets lays down the doctrine, flouted by the whole brood of æsthetic pygmies, "Music is the true element from which all poetry springs and to which it flows back," this one utterance absolves us from the obligation of going into any further detail.²⁹ There is one more dictum only which I should like to mention, because as it first appeared in the Weimar edition it has not yet been turned to account; it settles the question of Goethe's estimate of music once for all. "If language were not incontestably the highest gift that we possess, I should place music even above language and on the highest pinnacle of all."³⁰

Let us now turn to Kant, that brother sage, who, as we have seen, exercised such a strong power of attraction

over Goethe. It is hardly possible to imagine a greater contrast.

Should you be unacquainted with the chronological details a few words will suffice to fill in the gap. Kant's life moves in a perfectly straight line, which no event either objective or subjective ever diverts even for a moment from the direction once laid down. He was born at Königsberg, brought up in the local gymnasium, as a student took up mathematics and philosophy for his special work,³¹ became a private tutor, then "magister," then Professor, at the age of twenty-one he wrote his first work, in which we find these remarkable words: "I have already laid down the path which I mean to follow: I shall set out upon my course, and nothing shall prevent me from following it up,"³² he then travelled straight along this prescribed road for more than half a century without losing even a single day; for he never obeyed the calls to other universities, nor even left Königsberg for a single day, not even for the shortest pleasure trip. In this way he remained at work undisturbed "thinking himself out," until his intellectual faculties were extinguished.

You see then that the course of Kant's life,—the outer life of the man as well as the inner life of the thinker,—was one of unexampled simplicity. You have but to consider the fate of a Democritus, a Socrates, an Abélard, a Giordano Bruno, a Descartes, a Leibniz in order to see that perhaps no philosopher ever to the same degree and in the same way lived altogether, solely, and undisturbedly for thinking.

So far as Kant's intellectual personality is concerned this cursory consideration will help us to draw with infallible accuracy certain conclusions as a foundation upon which to build a living understanding of his philosophy. This homely existence, ordered with iron tenacity, points to a life of thought the features of which are

broad, simple, and consistent. The ruling power is a strong, rugged, passionless will, or perhaps we should rather say a will which inexorably fights down all those inborn passions of which there is no lack of evidence, forcing them into the channels which he chooses; and this rigidly determined scheme of life helps us to expect with certainty that we shall come in contact with an order of thought strictly and arbitrarily planned, manifestly organised upon a few leading principles. Beyond all this Kant's whole life bears witness to a necessity for thinking abnormally predominant over the necessity for seeing. As a matter of fact it is in this respect that Kant represents the exact antipodes to Goethe.

We may say of Kant that from his youth up he forcibly closed his eyes and ears,—the whole machinery of the senses. In spite of all inducements he never went further from Königsberg than a neighbouring property, and even that he could not put up with for long, because all change of surroundings disturbed his thoughts: only in the height of summer he would sometimes spend a couple of days in a forester's house, where in the whispering woods he wrote his bright and amusing *Observations on the feeling of the Beautiful and Sublime*; but this is the utmost limit to which he went in any sympathy with the charms of landscape scenery, and in any inclination towards becoming intimate by travel with the features of our good mother earth. There is an old German proverb which says, "Knowledge must be wandered into." For Kant that had no meaning. To one of his friends he writes, "All change frightens me, and I think it my duty to bear in mind this instinct of my nature" (*Letters*, I, 214). Nor was he in any way attracted by towns where the concentration of life brings out so much that is new in social, commercial, scientific, and artistic relations. That the contemplation of a fine building, the sight of a painting or a statue by the hand of genius, the

listening to the living performance of a love-poem should belong to those experiences which like a flash of lightning reveal the higher sense of being, setting free the individual out of that most cramping of all bonds—routine, throwing us in tears of admiration upon the bosom of long-departed souls, urging us to deeds which we dream that we can accomplish at once, but which our grandchildren's children will hardly live to see: of all this Kant knows nothing, or if he knows aught of it, he resolutely holds himself aloof from it. The craving to hear and to see, the longing of a soul hungering for a noble joy of sensation, is something in which he has no part. The reading of a few Latin and German poets whose verses he has stamped upon his memory in great numbers, suffices his modest need of artistic impressions. His dwelling is entirely without ornament; he has no æsthetic needs of any sort, except indeed a taste for good and elegant clothes, and even that may be ascribed to consideration for other people; of pictures he declares that they are only hung out of vanity: with the one exception of a portrait of Rousseau, his walls must remain bare. But this refusal to see goes still further. As a devotee of natural science he has the opportunity of becoming curator of a natural-history museum, and that too at a moment when every dollar must have been an object to him; we know what an important part of his life's energy Goethe devoted to the formation and extension of all manner of collections: Kant was not long in resigning his post, which to him seemed an objectless occupation, preferring to live in penury so long as he could give up his life to his thinking, rather than spend his time and waste his energy in the study of a host of specimens. In the same way he occupied himself during his whole life with physics—confining himself absolutely to the mathematical side of the science and neglecting the experimental side,—and interested him-

self passionately in chemistry without ever having seen a test-glass or a retort.

If all these had been the peculiarities of a commonplace person they would not be worthy of attention: dull, soulless people, are all round us, and learned men whose optic nerves only react upon printers' types, and have never in their lives seen anything but blackened paper, are plentiful enough. The only interesting point is the fact that Kant was naturally gifted with extraordinary keen organs of sense, and an almost fabulous power of observation bound up with an equally astonishing gift of imagination. Kant's eye was large, beautiful, and clear: his contemporaries were never weary of praising its magic fascination; to the last he could read the smallest print. His hearing was so extraordinarily sharp that even a distant rustling disturbed him. A physician bears like testimony as to his sense of smell. And like his senses, so also his imagination was of absolutely incomparable plasticity and exactness. The most interesting of the contemporary biographers of the Königsberg thinker, Jachmann, lays great stress upon this, and brings forward many instances in support of what he says. On one occasion, for instance, the presence of a Londoner at a party led to an allusion to Westminster Bridge, when Kant supplemented the Englishman's deficiency in observation and power of description with an exact account of the structure, the dimensions and style of which were so familiar to him, that the listeners took him for an Englishman and an architect!³³ We are told the same about his minute knowledge of Italy. Goethe's longing for "das Land wo die Citronen blühen" was foreign to Kant's nature; yet people who knew what they were talking about could hardly be persuaded that he had not lived there for years, so precise was his knowledge of every detail of the country and its cities.³⁴ We have plenty of further evidence to the same purport.

What Vasianski also tells us of his political insight, points to a rare power of perception : he was far quicker than Goethe in seeing through the characters and gifts of the chief personages in the great drama at the end of the eighteenth century, so that as Vasianski says, " people thought that they were listening to the talk of a diplomatist versed in the secrets of the cabinets." Even more astounding, because their correctness was more quickly proved, were Kant's military and strategical forecasts as to the revolutionary wars ; it was a time when his intellectual powers were already rapidly fading, indeed, he was beginning to lose the command of words ; yet the exact plastic conception of the geographical condition of the European countries remained actively alive in him. The study of geography and anthropology had from all time been his favourite occupation. His lectures upon these subjects were so fascinating that his lecture-room could hardly hold the crowds of his audiences, for besides the students there were many savants and men of the world who were in the habit of attending them. To quote the words of a contemporary, " in these lectures Kant was all things to all men, and it was perhaps in them that he gained the most useful and powerful influence over the men of his time." The older he grew the more exclusively, says Jachmann, " did he refresh his mind after his philosophical flights by reading about natural objects and phenomena." One of his colleagues says, " mathematics and physics, including chemistry, were the subjects from which Kant preferred to furnish his library." Another says, " he read enormously, especially works on physics, history, and anthropology, but most of all books of travel." A third tells us, " he seldom read philosophical books, not even those which were for or against him."³⁵ Kant, indeed, and this may be a comfort to some of us, when he had finished working up his own brilliant system of philosophy, became more and

more unable to make himself at home in the thought world of the scholastic philosophers: the most he was able to do was energetically to repudiate Fichte's *Wissenschaftslehre*, not because of any interest which he found in the book in itself, but simply because Fichte professed that it was based on his own (Kant's) doctrine. Natural science and geographical discovery remained his favourite study, and Jachmann assures us that "there is certainly no available book of travels which Kant has not read and graven in his memory." Kant's refined and mathematically correct conception of the special characters of the different European nationalities, needs no further proof than the fourth section of his *Observations on the Feeling of the Beautiful and Sublime*. I doubt, for instance, whether the Frenchman has ever been so sharply and so exactly analysed as he has been by this man who perhaps never in all his life set eyes upon a Frenchman. This is nothing but the power of perception. All this,—and I pass by many of the most striking examples for fear of wearying you—shows us a man who does not spend his days in puzzling out abstract ideas, but who carries in his brain a world of riches, a world which he perceives in its real shape, though with his eyes he has never beheld it; a man who peoples every country with those beings, human and others, which are peculiar to it, and can represent cities as if he had been present at their building. When such a natural scientist as Karl Gottfried Hagen, the author of the *Principles of Chemistry*, tells us of his speechless astonishment when he found Kant versed in all the details of experimental chemistry, although he had never in his life witnessed an experiment, we are bound to admit that Kant possessed an unheard-of power of conception with the most accurate faculty of apprehension. For chemistry is a science founded on perception, possessing no mathematical framework like physics, which therefore except by practical work in

the laboratory seems to afford nothing which memory can lay hold of.

What then is it that distinguishes Kant's marvellous power of conception from that of Goethe ?

Kant's power of perception is, as it were, the converse of that of Goethe. Of general impressions as conveyed by the eye, of what is called intuition, he is almost unreceptive ; but, on the other hand, when out of its various parts he can see a Whole arise, then his intellectual eye perceives it and holds it fast, and he is able at any time to take it to pieces or put it together as in the cases of Westminster Bridge, of a chemical combination, of the French national character. This characteristic of his intellect, which you may see here at work as it were superficially, penetrates the deepest depths of his philosophical method of thought. Thus, for example, in one of his searching metaphysical discussions, Kant writes, " We can only understand that which is our own work," and further, " we cannot perceive the combination of parts as ready-made to our hands, we have to make it for ourselves ; we must combine if we are to conceive anything as combined, even space and time " (*Letters*, 2, 496). But according to Kant " all phenomena are looked upon as aggregates or masses of given parts," that is to say as combinations (*Reine Vernunft*, 204), and consequently to him every perception represents something made, a " combination."

Although a man like Kant is naturally large-minded enough to be accessible to broad general impressions which are incapable of analysis, we yet see that he is not at his ease in such conditions : thus, for example, he says of the sight of the star-studded heaven : " it gives us undeveloped ideas which may perhaps be felt, but which do not admit of description " (*Natural History and Theory of Heaven*, conclusion): clearly even in this case, and even if he has to admit that the ideas are " undeveloped," he

is still under the impression of ideas and of ideas in great numbers, for he needs parts in order to convert them into a whole. This is the exact contradiction of the postulate which Goethe sets up in his first conversation with Schiller, "that nature must be portrayed by working from the whole to the parts."³⁶ Here you have in contrast two diametrically opposed methods of perception. But it will not be until we reach a further stage in our lectures that we shall be able to trace to its roots what it is that in this connection differentiates the two men. Let us for the present content ourselves with this first simple observation, and say, Kant is no artist, his eye is not receptive and therefore not creative. In his case it would be impossible to say that the optic nerve penetrated the brain from the retina, but we should rather say that the brain projected itself into the retina: for with him seeing is a true analytical function of the brain. While Goethe can say of himself, "the sense of sight is the sense by means of which I am best enabled to grasp the outer world,"³⁷ Kant is compelled to confess, "I only see what I think." That is why seeing is such a strain upon him, and why he prefers to see, and sees better and even more sharply, when his eyes are closed. Great analytical keenness combined with a limited imagination is the necessary result of this physical disposition; for imagination does not spring out of our own human self, but its material is drawn from the outside world as from a fountain. The essential organ of all creative artists is the eye,—the eye which has no concern with ideas whether developed or undeveloped, but, as female principle, accepts lovingly and without question whatever the impression of the senses as male principle is pleased to bestow upon it: the analytical power of thought with its creation of new combinations is a secondary consideration. Thus we see how an eminently artistic intellect like that of Goethe differs essentially

from that of Kant in its way of setting to work in order to arrive at any general philosophical conclusion. Goethe gives utterance to this as plainly as possible when he confesses, "I am completely puzzled when I make any attempt at comparing things side by side." It is not in his power like Kant to combine them into a whole, but on the contrary he has to see the whole in order to be able to understand the parts with all their peculiar properties as parts. "My manner of looking upon and dealing with natural objects, is to start with an impression of the whole in order to arrive at an observation of the parts": that is what Goethe says of himself:³⁸ and, therefore, in order to understand nature, he is compelled,—compelled by the peculiarity of his intellectual faculties,—to proceed as Seer and Poet, that is to say to create by means of perception.

We are now able to see in all clearness the contrast between the intellectual faculties of these two personalities. The one, Goethe, lives with his eye ever open and only arrives at thought by means of perception; the other, Kant, lives with his eyes closed and it is only by thought that he arrives at seeing. Still, I must issue a warning against attaching too great weight to any such formula: it serves no purpose beyond defining our momentary position. It is no more than a first comparison, a first picture, something like the distant view of a mountain-range on the horizon. We have to draw nearer; however much we may be lacking in science, we cannot afford to be superficial; and for that reason we must not hurry over the reciprocal relation between perception and thought. If the intellectual personality of Goethe is to lead us to a knowledge of that of Kant, we must in the first place become acquainted with it. And yet who can boast that he knows Goethe, the man who surveyed all nature? Up to the present there are but few who know him.

Perhaps it will be Kant himself, the incomparable analyst of the human intellect, who will give us a clue to put us on the right way. Towards the end of the introduction to the *Critique of Pure Reason*, we read, "There are two branches of human knowledge, which perhaps spring from one common root unknown to us, namely sensibility and understanding, the first of which furnishes us with subjects which the second enables us to *think*." This saying deserves lasting attention, it is as it were a first step in metaphysical thought. Still, it would be a very superficial verdict if we were rashly to make the assertion that in Goethe one of the two branches, sensibility, was highly developed to the prejudice of the other, while the converse took place in Kant. In Goethe's observations of nature it is precisely the understanding that is so extraordinarily prominent; hardly any other man has to the same degree enriched natural science with ideas, as contrasted with discoveries. As a matter of fact the relationship between the two "branches" is extremely complex. The two, sensibility and understanding, are as necessary to perception as they are to thought. And the degree to which both play their part in the same individual—on the one hand in perception and on the other in the thinking out of the subject perceived,—is a chief cause of the difference in the intellectual qualities of various personalities. The meaning of this can only be made clear by a concrete example, and so I shall venture to insert here an excursus on Goethe's doctrine of metamorphosis. In this way we shall search out the inmost depths of those intellectual qualities of which we have up to the present only been touching the fringe. The direct relation to Kant, of which you already have some conjecture, will then at once unveil itself before your eyes.

All the world is familiar with Goethe's account of his first important meeting with Schiller. Goethe, still in

the innocence of his heart, unconsciously making use of his own methods, lays before Schiller his doctrine of the metamorphosis of plants, and with a few strokes of his pencil produces a sketch of his *Urpflanze*, the primeval plant. Schiller listens attentively, but then shakes his head and says, "That is no experience, that is an idea." Goethe, nettled, replies, "Well! I am glad that I have got ideas, without knowing it, and that I see them with my eyes." Something seen with the eye: that is precisely the meaning of the Greek word *Idea*. Plato's ideas spring from such an intense craving for perception, that to him every single object is in his eyes a mere shadow. It is quite possible to possess an idea, without being conscious of it as a reasoning process; that, as we shall see in a later lecture, is what is continually happening to us all. But what we have chiefly to bear in mind here is the impossibility under which the perceptive genius labours of distinguishing between his ideas and his experiences, until the analytical thinker has cleared matters up for him. Until Goethe's meeting with Schiller the transformation of one leaf-form into another, or the change of vertebræ into a skull, was something quite as concretely "perceived," and consequently "experienced," as the single plants and the single bones which he had studied.

Here we have at last arrived at the contradiction which has been so often alluded to in the precise form which is exactly suited to our investigation, namely the contradiction between experience and idea. The open eye like the closed eye was the mere physical symptom of an intellectual tendency: the contrast between sensibility and understanding would have led us to a purely metaphysical discussion of the human intellect in general; a distinction between perception and thinking remains theoretical unless an appreciation of the practical difference between *Idea* and *Experience* has led the way.²⁰ Here then we

must bring our auger into play. We are all the more bound to do so inasmuch as this question of the relation between idea and experience,—expressed with such striking terseness in that conversation between Schiller and Goethe—is continually recurring when we speak of seeing, and will therefore often occupy us in these lectures, where the different way in which the world appeals to different personalities will claim our chief interest. For this relation between idea and experience forms an axis, round which our conception of what is in general meant by “perception” revolves. The great Goethe himself from the year 1794 was incessantly occupied with this problem. He recognised clearly that it is “as mischievous exclusively to obey experience, as it is unconditionally to follow the idea.”⁴⁰ Unremittingly he turned the question round and round, hoping to find a solution of the riddle. He perceived that the contradiction between idea and experience corresponded analogously to that between sensibility and understanding, between seeing and thinking, between analysis and synthesis, even in a certain sense between physics and metaphysics, between object and subject, between phenomenon and reality.

Reflection invariably shows that in each case these twin contradictions are rooted the one in the other; practice proves everywhere that the inclination of the one is to destroy the other. Like negative and positive electricity, they mutually attract and repel one another. If we follow Goethe’s thoughts upon nature—a matter of far greater intellectual import than the barren chewing of the cud of Faust and Tasso, and which has only become satisfactorily possible by the splendid second part of the Weimar edition—we shall see this question continually cropping up. In the treatise on Colour he writes: “Here it is that the practical man in experience, and the thinker in speculation, tires himself out, and a contest arises for which there is no peaceable or decisive conclusion.”⁴¹

Against the presumptuous narrow-minded attempts of the so-called "practician," Goethe is ever ready to break a lance on behalf of the rights of the Thinker, that is to say, of the rights of the understanding, of the idea, of synthesis, indeed even of metaphysics. If this statement should seem startling to men who have been brought up in the tradition of an unphilosophical as well as of an unmusical Goethe, I am in a position to quote his own words: "But here we shall above all confess and declare that it is in full consciousness that we find ourselves in the region where the metaphysics and natural history overlap, where the serious and trusty investigator loves to linger" (W.A. 2, 6-348). Pray note this expression, "loves to linger." And yet his own conception of nature and of life is too manifestly rooted in perception; he is a too objective thinker, and above all the eye, which reveals phenomena to him, is too completely the ruling organ in his personality for him ever, even momentarily, to be inclined to be false to the material world of empiricism. Wordsworth's famous lines:

To the solid ground
Of nature trusts the mind which builds for aye,

might have been coined for Goethe, with the characteristically limiting addition that Goethe only finds "solid ground" where there is something for the eye to see, whereas he feels mistrust and even repulsion for everything which the Physicists have to say about an invisible nature. When the philosophical botanist, Link, tries to confirm certain ideas of Goethe's on the growth of plants by bringing into comparison movements of the pendulum and of waves, so far from being flattered, the scientific poet resents this "introduction of modern, indeterminate, sublimated abstraction,"⁴⁸ and in writing to Schiller about the result to which his "observations of nature" lead, he says: "It becomes, in fact, *the world of the eye*,

and all reasoning resolves itself into a sort of theatrical performance " (15, II, 96).

Pray remember this expression, underlined by Goethe himself, *the world of the eye*. The importance of it you will only learn by degrees in the subsequent lectures. For the present let us content ourselves with one remark ; it is the world of the eye whose law leads Goethe unconsciously to bind the innumerable units of experience into a few ideal entities ; as the flower needs the sun, so does this philosophy expand under the bright rays of illuminating ideas. But ideas do not originate in mere empirical experience, but in reason ; and so perhaps you may begin to suspect that Goethe's way and Kant's way, though they may seem to diverge here, are bound to meet again in the end.

Do not let us undertake more for the present than we can hope to accomplish to-day. My first principle in these lectures is to keep you from all abstract thought ; that is tabu. Indeed, as a general principle I would warn you against all straining of thought ; nothing is more hindering to the understanding. Goethe hits the mark when he says, " Thinking does not help thought." What we call our special thoughts are a gift of nature ; there is no acceptance of the thoughts of others without a patient, open surrender of self. Besides this, I shall avoid attempting to lead you into the field of pure thought, until we shall have gained a perfectly clear conception the material for which can only be gathered together step by step.

Let us go back to the conversation between Schiller and Goethe. There could be no better theme upon which to build.

Schiller shakes his head and says, " That is not experience, that is an idea." For simplicity's sake I just now agreed with him, as so often happens. Yet, if he was not altogether wrong, he was certainly not altogether

right. The matter is not so simple as all that. Goethe was far rather justified in "feeling annoyed" and obstinately holding to his point. He and Schiller had quite unconsciously seized upon the question of metamorphosis at the very point where idea and experience imperceptibly overlap, that is to say at the metamorphosis of the plant leaf. It will not take long to explain the meaning of this assertion.

The Greek word *morphe* signifies *form* or *shape*, and *metamorphosis* means *change of form*. It is a misfortune for the scientific use of the word that Ovid's metamorphoses have given it an ineradicable mythological ring. The poet begins: "I am about to sing of forms changed into new bodies," and so we learn how Actæon was changed into a stag, Narcissus into a flower, Atlas into a mountain—all metamorphoses, with many more beautiful symbolical legends by which nature is pressed into the service of human imagination. In the case of the poet we know exactly what he means by "metamorphosis"; but we can defy any man to give a clear definition of the word when it is applied to natural science. Sometimes it stands for a demonstrable historic change of one thing into another, just as it does in Ovid's forms; sometimes we apply the word to the different phases of development of some individual living being which changes its shape; sometimes it means an hypothetical or even purely ideal return of different forms to a more or less conceivable, sometimes altogether inconceivable, primitive type, in which some see an actual historical ancestor, while others see no more than the necessary conception of the human intellect working out a system of order in a monstrous chaos of material. Goethe himself, who was so little capable of sifting the difference between experience and idea, has never declared clearly which of these several meanings he wishes us to assign to metamorphosis and the transmutation of organic forms;

it is doubtful whether he himself has any certain ideas upon the subject. Here, again, it must not be words or definitions, but concrete notions, that must guide your thoughts.

If you wish to obtain an antidote against the mystical and poetical conceptions of the word metamorphosis, and yet at the same time to preserve its concrete application by the Roman poet, you can find a solution of the difficulty in the language of modern geologists. The term metamorphic is applied to rocks which, in consequence of physical influences, such as heat, pressure, steam, and the like, have undergone a chemical and structural transformation. It is certain, for example, that all the mica schists and varieties of gneiss were originally deposits like the lime and chalk formations and the sandstones; probably they were rich in organic remains: but there came a time when by lasting or short, but enormously powerful, influences, they were altered through and through, the component parts were set free or fused,—what petrifications they contained were destroyed,—so that a unified crystalline rock took the place of stratifications with their rich variety of deposits. The chemical composition, no less than the physical quality of this new rock, is absolutely different from what it was before. Here we have a completely concrete, material metamorphosis; one thing has been made into another, and this is pure experience, not idea,—or rather let us say that there is only one thing in it which is idea, namely, the idea by which we recognise the new rock as being the same as the old, and therefore assert that it has undergone “metamorphosis,” although in fact the former rock has ceased to exist, but has made place for an entirely new one.

The moment we take organic nature into consideration the matter becomes more complicated. Think, in the first place, of the most familiar example, the butterfly.

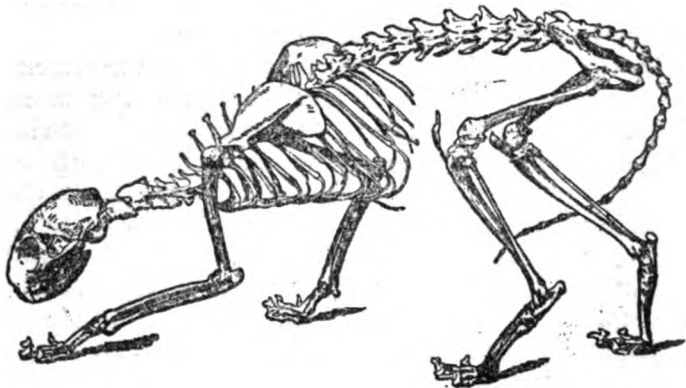
The caterpillar creeps out of the egg ; after a while the caterpillar imprisons itself in a cocoon or capsule ; an entirely new creature comes into being, the pupa or chrysalis, in which all the inner and outer organs undergo a far-reaching transformation. The conditions of life in this new inert being are so remarkable, that many pupæ may be preserved for years,—under the influence of cold for instance,—without prejudice to life; at last the capsule is thrown off, and what was once a worm dragging its loathsome body painfully from one flower-stalk to another, issues forth in the shape of the brilliant butterfly fitting from flower to flower on airy wings.

This metamorphosis of the butterfly,—a phenomenon of frequent occurrence in the vegetable and animal kingdoms, Goethe called "the successive, obvious metamorphosis." Although we must admit with awe that here we meet one of nature's inscrutable marvels, we unhesitatingly claim this species of metamorphosis as a simple "experience." As a matter of fact, there is doubtless a great deal of "idea" in our interpretation of it: Goethe himself ended by suspecting as much; but it will be better for us to proceed further without philosophising, and bring out another example, which is also quite "obvious," but which, instead of exhibiting a successive metamorphosis—a succession of changes,—shows what Goethe calls by way of contradistinction "a simultaneous" change.

Here we have the skeleton of a cat. I want you to take no notice of the rest of the picture, but simply to fix your eyes upon the vertebral column from the skull to the tip of the tail.

If you count the bones of the spine and of the tail you will find that they are forty-six in number, or forty-four, if you should fail to observe that where they are attached to the pelvic bones, three have grown together into one single mass.⁴⁸ No one will hesitate for a moment to

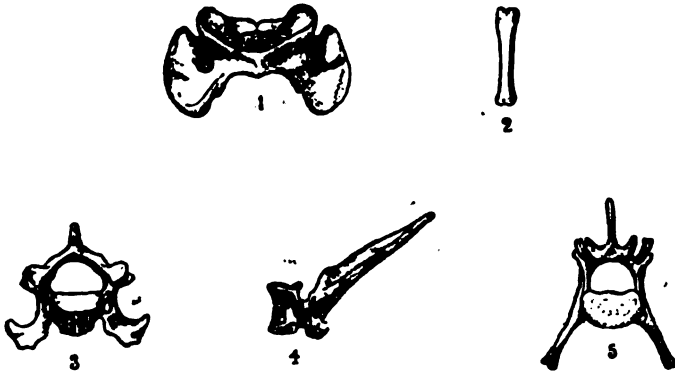
recognise every one of these forty-six bones as a vertebra. Even a savage would, I believe, understand and endorse the statement that we have here the same bone repeated forty-six times ; at any rate, we know by experience that our children have no trouble in mastering this notion. The homogeneous conception of this chain of bones is brought home to us on all sides ; we recognise the manifest conformity to certain leading features of the structure of the several members, their evident connection for the formation of one homogeneous mechanical bodily axis,



the proportional distribution of their physiological function as protectors of the spinal cord. And yet, if you look more closely into this chain of bones, this forty-six-fold repetition of one single form, you will see that no two of them are perfectly alike. We are in the habit of recognising the bones of the front and hind legs as analogous, but we are careful to distinguish between them and give them special names ; yet they correspond far more nearly than the vertebral bones. Here are the first and last vertebræ of another cat's skeleton.

Is there in this wide world anything more different ? The one is a tiny, cylindrical, elongated little bone, with small club-shaped thickenings at each end,—the other

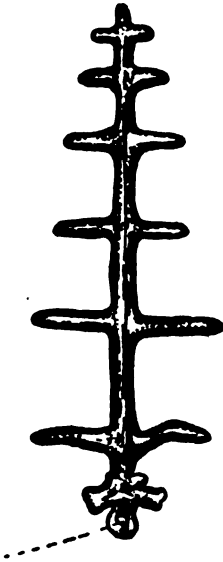
is a powerful bone, vertically compressed, horizontally winged. And now with this first vertebra, the so-called Atlas or carrier, compare the second vertebra, which anatomists call the Epistropheus or the turner. It is extended lengthwise, compressed in breadth, furnished with a high dorsal ridge, which stretches beyond the other vertebræ both front and back. Here, again, is an entirely new form absolutely unlike the other two. And now that your eye has been sharpened, pray look once more at the spinal column as a whole ; observe the



high spiny processes on the dorsal vertebræ, no two of which are exactly alike ; observe how these thorn-shaped processes are suddenly pressed forwards, not backwards, in beak shape, whereas the vertebræ in the lumbar region exhibit more and more powerful processes directed diagonally downwards, with, as a new peculiarity, swellings which extend forwards and backwards on both sides.

We need go into no further detail ; we have gathered material enough to ask ourselves seriously by what right we include these bones, all differing from one another, in one idea which we call "vertebra." I say idea intentionally, because obviously there can be no homogeneous concep-

tion, no patently visible form in which this Atlas, this spiny dorsal vertebra, this smooth caudal bone, could be included, unless with the help of theoretical reflection we should think out a typical vertebra or ideal vertebra—as you may please to call it—the shadowy existence of which does not exist outside of our own brains. Even the development of the cat in the womb will not help us



to the conception of a neutral vertebral form, as it were. For even if in the early life of the foetus there should be a stage when the so-called primary vertebræ lie the one behind the other in the shape of similar discs, what does this mean but that we are not able to detect the latent potential changes which will soon manifest themselves?⁴⁴ More than that, these so-called primary vertebræ are not even the parents of our vertebræ. It is rather muscles and ligaments that it is their function to produce; then along the whole length of the dorsal axis the so-called perichordal tube arises without any indication of divisions. Later a series of changes takes place, out of which at last the true vertebræ proceed, in such a

manner, indeed, that every single true vertebra takes up fractions of two different primary segments, to which other forms again are added to complete the vertebra,—forms which in no wise touch or are in relation to one another, varying in different portions of the axis of the body.

I think you will agree that in this conception of the vertebræ it was not experience alone that was at work, but also idea, and indeed idea playing a considerable part. You will probably feel some hesitation when you look at these forty-six different bones, and a Goethe

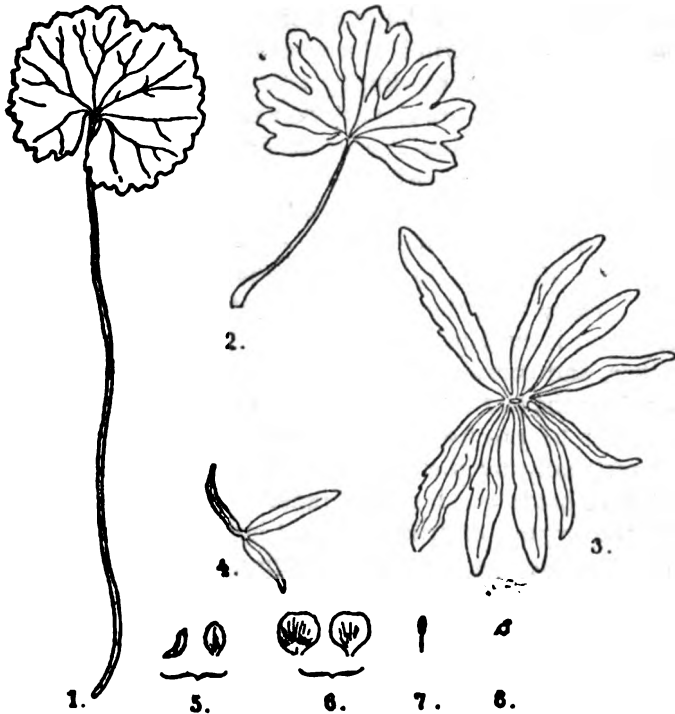
teaches you that they are all evolutions of primary vertebræ which were once uniform and entirely alike, and therefore to be conceived as originally related to one another, just as the butterfly is related to the chrysalis and the caterpillar;—that the vertebral chain of bones is an example of “synchronic transformation,”—of simultaneous metamorphosis. You will probably be inclined to shake your heads and say with Schiller, that is rather idea than experience. The “transformation” of something which only, or perhaps even hardly, exists in my imagination and only floats before me as a symbolical type, may be a useful thought, but it is surely a bold one. You must however consider further that this thought is no mere abstraction, but an “idea” in the sense of Plato to which I have alluded above. We are dealing with the perception of what is seen as a combined whole, with what the famous Greek philosopher called a *synagoge*. It is as if these many vertebræ laid a burthen upon our power of conception, as if they disturbed the eye and did not allow it to attain that power of sight which “rests quietly and purely upon objects.”⁴⁵ Goethe himself, who “strove to compass the organic world with passionate senses,”⁴⁶ suffered much under the plethora of forms, and from the consequent impossibility of taking them all in. His whole rich work in the fields of botany and zoology is directed to one single endeavour which we may sum up in the words, he wished to make visible to others what he himself had seen. Kant, as you will remember, closed his eyes before the multitude of phenomena, whereas Goethe came to the assistance of the eye, and simplified the image by condensing that multitude into a few ideas. What we look upon as theoretical in him, and what has therefore alienated the poet from so many of us, is all in the interest of the comprehension of that “world of the eye.” Even his optics cannot be understood until we realise that the work is no less than

a heroic attack against invisible, arithmetical schemes on behalf of conceptions capable of being perceived. This "simultaneous" metamorphosis cannot then by any possibility in his case be a mere idea, but is on the contrary, if I may say so, experience and something more.⁴⁷

The contrast between a metamorphosis which is consecutive and almost entirely empirical, and a metamorphosis which is simultaneous and almost ideal, will have given you some definite notions as to the relation between experience and idea within the scope of this range of thought; and now at last you can understand to what extent the so-called "metamorphosis of plants" stands precisely upon that critical point where experience and idea overlap one another, so that it is impossible to draw a boundary-line. The metamorphosis of plants is, indeed, at the same time "successive" and "simultaneous"—consecutive and synchronous! Both conceptions are permissible; the question of which we should choose depends upon the point to which we turn our attention, and that is why we can hardly avoid here the interchange between experience and idea. That Goethe at this point, where the problem, as it were, slips through our fingers, began his comparative studies, is less a matter of accident than of instinct: for it was precisely the wavering standpoint between experience and idea that was calculated to furnish him with the right impetus for the attainment of what he wanted for his "world of the eye."

Here you have several plants picked at haphazard in the fields this morning. Although Goethe's interest was first excited by the sight of the Fanpalms in the Botanical Gardens at Padua, it is characteristic of his doctrine of the metamorphosis of plants that he did not keep in view trees or that branch of the vegetable kingdom which is richest in forms—the cryptogams or non-flowering plants, but first and foremost directed his

attention to those herbs which come quickly into growth and bloom and as quickly die.⁴⁶ What gives this a special importance is the fact that Goethe's doctrine rests in no way upon scientific analysis, but exclusively upon perception. A peculiar amalgamation of the ideas



of rest and motion, of "being" and "coming into being," here takes possession of what he actually saw, transforming the phenomena of inscrutable nature into ideas better adapted to the comprehension of the human mind. This creation of Goethe's sometimes reminds one of the higher mathematics; there is the same violent bursting open of a closed door⁴⁶,—indeed, the analogy is quite

complete, except for the fact that in the one case it is the realm of abstract perception, in the other that of concrete perception which is dealt with.

If we look at these plants we shall see a creature complete from the root to the flower. It is just as finished, self-contained, and definitely inclosed within its own limits as our skeleton of the cat. The leaves, as you see, vary in form; the so-called cotyledons at the foot of the stalk are simple, not crenate or indented, whereas the others are crenate though in different degrees, the segments growing deeper at first from leaf to leaf, and then again decreasing.

In these other plants you will never find two leaves exactly alike in shape: here, for instance, the lower leaves are fifty or a hundred times larger than the upper ones. There are other cases where the polymorphism of the leaves is even more pronounced. But you must look further, and consider the flower. We cannot help being struck by the leaf-nature of these single petals, which can moreover be proved by important anatomical evidence, and especially by their position in relation to the stem; and this holds good of the inner whorls, the stamens, and the organs of fructification, however much to the outer eye they may seem to differ from green leaves. All this is the gift of what Goethe calls "our guardian angel, the Genius of Analogy."⁵⁰ Of course, petals are not leaves any more than leaves are petals; their structure is in many particulars a different living organism, and this is even more true in the case of the sexual organs; and when Goethe says, "We know that the stem-leaves are only preparations and pre-indications of the flowers and reproductive organs,"⁵¹ I confess that such an exaggerated figure of speech seems to me to be most questionable. The stem-leaves are the most important nutritive organs of the plant; to describe them merely as "pre-indications" of the petals, has no more sense

than if I were to call the stomach a pre-indication of the brain. We see what this leads to when Goethe sets up the monstrous assertion, "The female part of the blossom is no more a special organ than the male"⁵²; this brings us to a doctrine of final unity, and science is ruled out of court. Let us, however, for the moment accept the analogy and agree to refer all these organs



to the one idea of "leaf," reserving certain reflections for further consideration hereafter. This whole series of leaves stands before our eyes in the same way as the series of vertebræ in the cat's spine. We see them all before us, side by side, each fulfilling its special function. If we should look upon these forms as "transformations," we can only treat them, as in the case of the vertebral column, as a synchronous or "simultaneous metamorphosis," that is to say, as a pure idea, and Schiller is

right when he says, "that is not an experience"; for even though the leaves are developed successively, no one leaf arises out of another, nor are green leaves changed into petals, as the butterfly is developed out of the pupa, but the transformation merely refers to one general idea in our brains, called leaf. That, however, was not the way in which Goethe, in the first instance at any rate, considered the matter—on the contrary, he practically starts with the conception of an analogy with the consecutive transformation of insects! Let me explain how that came about.

When Goethe began to busy himself with such matters, the *metamorphosis plantarum* was a pet phrase and shibboleth of the investigators of nature of that day with their muddled generalisations. For example, in a dissertation which Linnæus himself, though not its author, sent to the press in 1755 under the above title, we read, "The green caterpillar-skin of the plant bursts: but together with the lacework of the calyx it remains hanging to the main body of the plant which continues to shed its skin . . . the caterpillar-skin remains like the green bark of the stem, but the butterfly peeps out merrily and flaunts the gay colours of its petal wings."⁵³ Here we have a true pattern of false analogies which might commend itself to some modern Ovid, but would certainly not suit any investigator of natural history. Now Goethe stood under the influence of the Linnæan school: when he began to work at botany its works were his "daily study," and he has left us many direct and indirect proofs of that fact. The *Philosophia Botanica* of Linnæus had taught him that under certain conditions of soil petals are changed into green leaves, and conversely green leaves into petals. *Principium florum et foliorum idem est. Luxurians vegetatio folia e floribus continuando producit*, etc. The whole of these and similar "facts" are published by Linnæus under

the title of *Metamorphosis Vegetabilis*.⁵⁴ That is the origin of Goethe's use of the word metamorphosis, which was a misfortune, inasmuch as it led him and others astray: but it also accounts for the first incentive to an idea possessing such a penetrative power of observation, that Goethe was justified in saying that he saw his idea with his eyes.⁵⁵

In order to understand this we must leave the standpoint of Rest, which we occupy so long as we remain in contemplation of these finished plants, in order to take up that of Motion. These annuals are all of quick growth: their whole vegetation only comprises a few months. That is why Goethe conducted most of his observations in this field in Italy, where it is possible to watch the breaking out of new leaves from day to day and their growth from hour to hour. "What in the North I only suspected, here (in Frascati) I find revealed" (*Letters*, 3, 10, 87). Now, however, I must call your attention to this: the stem of these plants is a simple form of axis: it grows upwards, and as it grows so-called nodes or joints are formed at fairly regular intervals: at each node a leaf is produced: this process goes on without variation, and even where the leaves surround the stem in whorls, as they do here in the corolla of petals, a closer observation, and the evidence of frequent malformations, go to show that in this case we must accept the presence of greatly shortened internodes. We human beings who are the result of the polymorphism or great variety of form in the animal body, find such a striking uniformity in the plan of this vegetable structure, that we are at first inclined to notice nothing beyond the strict repetition of similarity, and it is not until later on that our attention is arrested by such differences as exist. Johannes Müller, the great physiologist, has remarked that it is not the recognition of reason, but imagination which detects in the plant "a manifold whole made up

of identical members." ⁶⁶ Goethe gave expression to the same idea in poetic form :

A driving consecutive force, raising itself, renewed,
Node towering on node, but always the same first form.*

We see the simple stem, detect the simple law, in obedience to which on every node it bears a leaf, and look upon the leaf as an equally uniform entity, " always the same first form " : we start from the preconception of " identical members," and in our eyes it is always one stem carrying one leaf repeated indefinitely. That is what logicians call a " subreption," that is to say a fallacy arising out of impressions of the senses. Now imagine a man gifted with the most lively fancy, and an almost unbridled passionate nature, who under the sunny sky of Palermo and Naples watches the plants growing under his very eyes ! Every morning he sees a new development in the same identic member, and every morning it assumes a new shape, differing from that of the day before ; it grows in breadth, it grows in length, the outline varies with the many motions of the plant : suddenly, without any interval, the organ contracts itself into a small smooth-edged calyx leaf, spreads out once more into a coloured corolla, again shrivels into the almost dustlike anther, again widens out as it were with the force of a last breath of life into an ovary or seed-vessel, which the investigator breaks open to find the tiny germs of the future cotyledons of a new plant. For a man in such a frame of mind there is in all this no standstill, no rest ; the motionless plant is to him a thing in motion, the form of a being undergoing a daily process of change ; as for the leaf which is really firmly fixed, which, until the autumn sets it free, remains as unchanged as a crystal, Goethe sees in it " a very Proteus

* Gleich darauf ein folgender Trieb, sich erhebend, erneuet,
Knoten auf Knoten getürmt, immer das erste Gebild.⁶⁷

which can show itself in all manner of shapes” ;⁵⁸ he sees the metamorphosis taking place under his eyes ; as a human bosom heaves and sinks, he sees the leaf spread itself out and contract, from cotyledon to fruit, and his ears ring with “ the six footsteps of Nature.”⁵⁹ In all this, as you see, he perceives motion and continuity. He ignores the fact that as in the vertebral column of the cat, so also in the plant the different parts are in close relation, absolutely autonomous, and moreover of unequal physiological value,—in his mind he is dealing with a true, consecutive metamorphosis, and just as the caterpillar is transformed into the butterfly, so in this case he sees the practical transformation of one thing into another thing. “ It is no dream, no play of fancy,” he assures Frau von Stein (*Letters*, 10, 7, 86).

That is why Goethe, who thought that his eyes had witnessed the transformation of the leaf a thousand times, and upon whom, as he says, this perception had acted with the driving potency of passion,⁶⁰ was taken aback and nettled when Schiller, the man who seldom turned his eye to organic nature, critically and calmly met him with the observation, “ that is no experience, that is idea.” It was just in this conception of the metamorphosis of plants that Goethe imagined himself to have the most intensive “ experience ” : it was from this that he derived the excessive wealth of his power of observation : it was this that led him to the idea of metamorphosis in the rest of organic nature. At the beginning of his Italian journey we find him oppressed by the varied richness of plant forms : “ I do not yet see how I am to disentangle myself,” he writes from Padua. He lacked some intermediary organ which should enable him to take in, that is to say to experience, the whole field of life. “ What is perception without thought ? ” he asks in the same letter, a question which we shall have to discuss very fully in our later lectures, but which already

shows us what limitations we must set to ourselves before we accept the saying that Goethe was all eye as something to which a comprehensible and true meaning can be attached. There is no true perception without thought. A great seer must also be a great thinker. The special part which thinking, as organ of perception, must have played in Goethe is clear from his own admission, "no true keenness of sight: hence the gift of seeing the charm of things,"⁶¹ and from the other saying, "sight itself is thought."⁶² We shall see clearly that as a matter of fact Goethe's sight was not keen, when in the next lecture we compare him with Leonardo da Vinci.⁶³ Kaspar Friedrich Wolff was an example of keen sight, when armed with his dissecting knife and microscope he laid the foundations for the comparative anatomy of plants. Wolff showed that we have no right to speak of the origin of the parts of a living being until we have learnt to distinguish between the three following things: histological elementary structures, tissues in their varieties, and organs.⁶⁴ Next he observed the practical history of the birth of the stem and its side-organs; he discovered the point of vegetation, followed the genesis of the vascular system out of cells the walls of which are reabsorbed, studied the growth of the leaf, etc., and upon the basis of all these observations he came to the conclusion that all the parts of the plant might be referred either to stem or leaf.⁶⁵ Wolff made many mistakes, yet his method was that of strict empirical natural science. Goethe did nothing like that: he was not fitted for work of that kind; a few weeks after he had uttered his cry of despair at Padua, "how am I to disentangle myself? What is seeing without thinking?" he wrote on a scrap of paper, "Hypothesis: everything is leaf; and it is this simplicity which renders possible the greatest complexity."⁶⁶ He now at last saw that he had removed the cataract from his inward eye; thinking and

perception were in harmony, and in this way experience streamed into both his inward and his outward eye; the whole world stood revealed to his gaze. From Naples he writes to Herder that he now has at his command, not only all plants that exist, but even those that do not exist, but possibly might exist, and he exclaims with intoxication, "Nature herself must envy me."⁶⁷ And now comes Schiller, the scholar and thinker, and, so far from envying him, shakes his head!

I may hope that my short exposition may have sufficed to make you at one and the same time intoxicated with Goethe and critical with Schiller, for such a frame of mind alone can give rise to an exact conception of the importance of Goethe's true doctrine of metamorphosis, and, as a result of that conception of his method of perception, to an appreciation of the relation between experience and idea as it presented itself to his mind.

You will have remarked in what a peculiar fashion in his conception of the metamorphosis of plants the ideas of motion and rest, of simultaneity and sequence, of unity and plurality are so to speak superposed the one upon the other. In the insect world this does not take place, or to speak more exactly it does not take place in any striking fashion, for in the case of insects the one develops itself out of the other in course of time—even in the vertebral column it only takes place out of sight, for there from the outset the one is immovably attached to the other. In the plant on the other hand we see a living being not only growing, but daily producing new organs which had not previously existed. In this case therefore interchange of conceptions of simultaneous cohesion and of successive sequence became possible. The conception of simultaneous metamorphosis, in its broader sense, is the foundation of all comparative anatomy, and the conception of successive metamorphosis commonly observed in the lives of insects and of many

of modern science, the fantastic Ernst Haeckel, into the region of the densest mountain mists, where he looks upon his own wraith in the light of a new revelation.

Here we see what Goethe owed to Schiller. Goethe has told us later with what "unconscious simplicity" he was wont to philosophise until Schiller and Kant enlightened him.⁷⁰ He was deep in aimless struggles over the *Urpflanze* (the primitive plant) and the *Urtier* (primitive animal): his standard for the significance of leading anatomical facts was so poor that he was capable of writing, "a leaf that absorbs moisture is called a root."⁷¹ Then came Schiller and roused him out of his uncritical slumbers. A year and a half after that meeting Goethe was already aware that the "primitive form" for which he had been seeking "was no child of the senses, but of the mind."⁷² He would then no longer have been able to exclaim sarcastically to Schiller, "I am very glad to have ideas which I can see with my eyes," for he would have to say, "with my mind's eye," and that was just what Schiller meant. A few years later Goethe says that the *Urpflanze*, the primitive plant, is transcendental, and says of the *Urtier*, the primitive animal, "that, after all, is no more than the conception or idea of an animal," or else he speaks of ideal *Urkörper*, primitive bodies, and is careful to add, "realise the idea and it loses its value." Five-and-twenty years later Goethe wrote the little chapter on *Bedenken und Ergebung*, "Reflection and Submission," which I strongly advise you to read over and over again. In these two pages Goethe clearly points out the cause of the conflict between idea, independent of space and time, and experience which is confined in space and time. Then he goes on, "that is why in the idea simultaneity and successive sequence are closely bound up together, while in all empirical experience, on the contrary, they are always kept apart." You can now understand these words exactly, since you

can apply them to the concrete conceptions which you have gathered from plant life, but which unfortunately Goethe has not named in the passage quoted. You can also understand Goethe when he adds, "A natural operation which idea represents to our minds as being at the same time consecutive and simultaneous seems to drive us into a state of something like madness." In fact the road which Goethe pointed out in his doctrine of metamorphosis is a dangerous road which should not be followed without critical caution. For if we look upon our ideas as being experience, that road will lead us into the condition of madness in which our modern biology has enmeshed itself, and which threatens utterly to extinguish the power of independent observation ; whereas, on the contrary, if we draw ideas from our experience, we shall be following a road which will lead us into that world of the eye of which Goethe was the herald, and the importance of which for the future of culture no human being is yet capable of estimating.

* * * * *

Let us go back to Kant. Although we may seem to have wandered far afield we have yet reached a point where in the metamorphosis of plants Goethe reaches out his hand to meet that of Kant. I am sure, moreover, that there are many of Kant's views that you will understand much better, now that you have reached him through Goethe, than if you had attempted to follow him along the road of abstract conceptions. Goethe, insensibly, and while simply giving homogeneity and unity to the masses of forms which his eye detected, has led us into the depths of Kant's philosophy.

In the *Critique of Pure Reason* Kant goes back to Plato, in order, as he says, to re-introduce the word idea in its "original sense." What this original meaning was he tries to express in the following way : " Ideas according

to Plato are prototypes of things themselves, and not mere keys to possible experiences." This does away with our modern weakly interpretation of the word as almost synonymous with "thought"; an idea is no mechanical help, no intellectual scheme for the more convenient collection of experiences, but an idea is an image, and, as you will learn from our later lectures, "a creative fact. A vegetable, an animal, the regular ordering of the structure of the universe, presumably therefore also the complete laws of nature, show clearly that they are only possible in consonance with ideas" (R.V. 369 f.). You see how all this is based upon perception, and how closely akin this method of thinking is to that of Goethe, which was for ever hunting for prototypes for that established order which it had discovered in the vegetable and animal kingdoms. But remember that Kant's eye is by no means directed outwards, but altogether inwards; he analyses everything which forces itself upon his intellect exactly as he did Westminster Bridge, and takes to pieces the several component parts just as he does when the impression of the star-studded heaven strikes his soul. Not for a moment, therefore, do the notions of Idea and Experience correspond, as was the case with Goethe, to the prejudice of clear recognition. On the contrary, Kant's whole philosophy in its origin as in its aim springs from the perception that our human experience, of which to this day many men untrained, or wrongly trained, in philosophy speak as something simple and palpable, is in reality a very complex proceeding, and that the formation of ideas is the result of a tendency which is certainly inevitable, but at the same time dangerous. It was to the disentanglement of these conditions, to the so-called critique of recognition, that Kant devoted the greatest part of his life. A first result of his analysis runs as follows: it is true that experience is rooted in the impressions of our senses, but beyond

that it stands in need of understanding, since no experience can have any existence without the combination into unities of our innumerable observations; this combination must manifestly take place according to laws which exist within ourselves, not outside of ourselves: ⁷³ without understanding it would be impossible for me to reduce the endless multiplicity of experiences to fixed, definite "things," and at the same time to discriminate between them. ⁷⁴ Still less should I be able to unite two different phenomena like "caterpillar" and "butterfly," and to assert that the one is a transformation of the other.

So much as a first guide to what is meant by experience. A second important result of Kant's bears upon ideas, and establishes the fact that ideas never fully grasp the true value of a phenomenon, but go no further than formulating the particular view that our thoughts take of it. Our understanding deals with the perception of things, our reason, as the parent of ideas, with the understanding which fixes and limits those things. "If then pure reason also deals with phenomena," says Kant, "it still stands in no direct relation to them and to the perception of them, but only has to do with the understanding and its judgments" (R.V. 363). Every single word here is of pure gold. Ideas do indeed "deal with phenomena," that is to say they are called into being by objects perceived, and aim at a renewed perception of them; yet they are not directly in relation with the perceptions by means of which we attained a knowledge of these objects, but with our understanding and its judgments, that is to say with what we human beings think of them. In short, the range of the idea is determined by the limits of human powers. You have but to consider Goethe's doctrine of the *Metamorphosis of Plants*, and you will be in a position thoroughly to understand the general meaning of this assertion without any

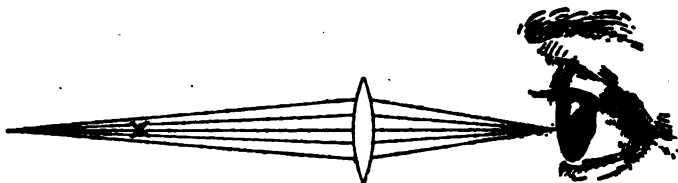
deeper initiation into Kant's philosophy. For it is certain that Goethe's idea had an objective foundation, formed upon the observation of thousands of plants: but it is even as certain that his idea is concerned with them not indirectly but directly. "I do not know how I can disentangle myself," wrote Goethe, as you will remember, from Padua: he wishes to disentangle himself, his thoughts, his thoughts about things, not the things themselves. Long and passionately were "the understanding and its judgments" at work before the idea of the transformation of lateral organs, or indeed possibly of the whole united organs of plants, revealed itself to the reasoning power which was directed upon them out of one form, a form which no human eye had ever seen, and which Goethe only called a leaf for want of a generic term "by which to describe an organ capable of such various transformations."⁷⁵ No sensible man will deny that this idea is an image and not an experience, and even the most unphilosophical man in the world must see and admit that this image relates not directly to the objects perceived, but to the verdict pronounced upon them by the human understanding and thought. Goethe's assumed "primitive organ" is so little a matter of perception, that we have not even a word applicable to it, but when Goethe lets fall the expression "great abstract unity,"⁷⁶ we feel that the descriptive word "leaf" better meets the case; for an idea must really be an image serving to help us to a clear comprehension of our perceptions, not a logical conclusion, and equally not an abstract conception. An idea is productive, creative, it is the servant of that power of imagination of which Kant says that it must not run into fanaticism, but must "invent under the strict supervision of Reason" (R.V. 798), and even if the outer eye should fail to see these invented forms, and consequently the understanding should only name them clumsily and tentatively, that is

to say, by symbols, their essence is none the less perceptibility. If Goethe had written in his notebook, "Hypothesis : everything in plant life is abstract unity," he would have rendered us and himself scant service ; whereas the words, "Hypothesis ; everything is leaf " (see page 64), have the value of a permanent enrichment of the human world of conceptions. The idea, then, although purely a product of human thought, is derived from perception, and its final goal is once more perception. How clear its value has been shown by Kant in a noble image, for the understanding of which I must remind you of the following elementary fact in optics.

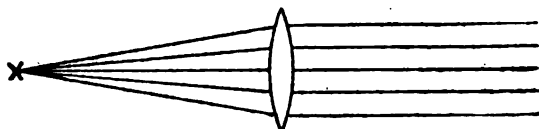
Think of a bi-convex lens such as you have in the best magnifying glass. Such a lens has the following peculiarity,—a certain point marked X is called its focus, at which distant rays of light are collected and generate heat.

I hold this lens before my eyes and look at an object through it, and if the object be beyond the point X, I shall see it with the utmost clearness, but inverted. If I move the object nearer, it is magnified, but less defined, and will suddenly disappear altogether ; that happens when it reaches the point X. The first illustration shows you why. The rays go out parallel to one another, and consequently there is no point, however distant, where the eye can gather them together. Now if I proceed to move the object nearer so that it comes to lie between the point X and the lens, it immediately reappears, and no longer inverted, but upright, and if the lens is very convex, greatly magnified. Now whereas the previous image was a true image, an image which you saw where the object stood, the present image exists only as an imaginary phantasy of the brain. Indeed, there takes place an unconscious operation of thought, and involuntarily we refer every single point to one lying far away in the background. That is to say, we transfer the

object to a spot where as a matter of fact it does not exist. This is especially conspicuous in concave mirrors which enable us to call up living apparitions in the empty air. If we construct this on purely optical prin-

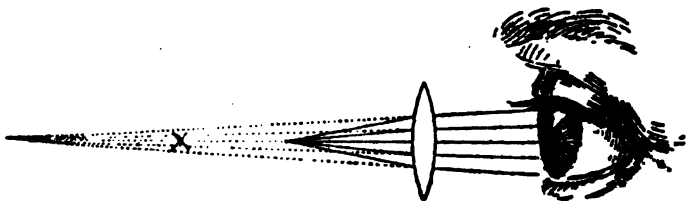


ciples, as we did before, you will see that we are claiming an imaginary focus for our given lens or mirror: the physicists call this the "Virtual Focus," and in Kant's day the expression in use was still the Latin *focus imagin-*



arius, and that implies that in the contemplation of the image, we picture to our imagination a focus where in reality none exists.

With the clear representation of these optical facts



before your eyes you are now in a position fully to appreciate the value of Kant's instructive illustration. He tells you in detail that ideas will never furnish you with "conceptions of special objects." You have seen

before that although metamorphosis may have given us the idea of one primitive organ in plant life, still it has not given us the conception of a certain object, but only an "abstract unity" on behalf of which we have to content ourselves with the symbol "leaf." Obviously, then, ideas do not possess what Kant calls a "constitutive" value, indeed they bring no concrete contribution to the true building up of knowledge, for which they have no more than a "regulative," in other words a directing importance. Now comes the illustration. "On the other hand, however, ideas have a pre-eminent and indispensably necessary regulative use, namely the directing of the understanding to a certain aim, in respect of which the lines of all its rules converge upon one point. Being no more than an idea, this point may be compared to a *focus imaginarius*, for it lies altogether beyond the bounds of all possible experience, so that our concrete notions concerning things do not in reality proceed from them, although they may seem to do so. Nevertheless this *focus imaginarius* is of real use, inasmuch as it serves for the attainment of the most perfect uniformity together with a maximum of expansion. Out of this there springs a delusion as if these directing lines were the output of an object itself lying outside the field of empirically possible perception—just as objects are seen behind the flat surface of the mirror: but this illusion, which we are able to prevent from exercising a deceptive power, is yet indispensably necessary if we wish, in addition to those objects which are before our eyes, also to see those which lie far away behind our backs,—that is to say, if we would train our understanding to extend beyond every empirical experience, and so to attain the utmost possible degree of expansion" (R.V. 672 seq.). You see how sharply, and at the same time how clearly, Kant defines and limits the essence of idea; and we understand him when he tells us of ideas that they "are not

drawn from nature," that is to say, our interrogation of nature is prompted by these ideas, and "our perception of nature is in our judgment deficient so long as it is inadequate to our pre-formed ideas" (R.V. 673). Ideas are thus seen to lie in the *focus imaginarius*, and it becomes clear that their distinctive feature must be that they "go beyond the bounds of possible experience" (R.V. 377). Certainly without experience we should not be able to lay hold of them: they are formed on a plane optically lying far behind experience, and therefore it is impossible that "any object furnished by experience should ever be in agreement with them." And so we arrive at the fundamental result: idea and experience can never correspond, at any rate never completely and lastingly.

All this seems to me quite clear. And when Kant says, "all human intuition begins with perception, follows on to comprehension, and ends in ideas" (R.V. 730), we can, as it were, see his meaning with our eyes long before we have plunged into the labyrinth of the *Reine Vernunft* (Pure Reason), and you may take my word for it that this appreciation of his meaning is absolutely correct. You must only hold fast to the image of the *focus imaginarius*—a true Kantian image, and to the example of the metamorphosis of plants—a true Goethian example. The perceptions,—in other words, the experience—are the numbers of plants that are under observation: purely scientific comparative anatomy,—whether consisting in practical study under the microscope, such as that of Kaspar Fr. Wolff, or in the collection of double carnations as Goethe collected them,—means work with comprehensions and judgments: these accumulate enormously, their numbers fill us with despair. We do not see our way out—"I do not see how I can disentangle myself";—we take refuge in experience: at a point nearer than the focus of our eye's lens

the material image fades away, while an imaginary one, greatly magnified, takes its place, and now in the distant background of the *focus imaginarius* we see an idea, and that furnishes our understanding with the guide to a certain goal, and at one and the same time lends to its endeavours "a maximum of uniformity combined with a maximum of expansion." Those are the three steps: experience, comprehension, idea."

The culminating point of the *Critique of Pure Reason* is this sentence: "all human recognition begins with perceptions, leads thence to comprehension, and ends with ideas." It introduces the last section of the "elementary instruction": it ends the main work: the *Methoden Lehre*, or doctrine of method which follows, making hardly one-fifth of the book, is as it were only an appendix, just as at the end of a work on the anatomy and physiology of plants you will find a sketch of their systematic classification. I do not wish to lead you into the mistake of supposing that these observations of ours will render you at one bound capable of understanding Kant's metaphysics, or of considering yourselves as above the necessity of laborious study: yet you must surely feel that the practical understanding of the way in which this man "saw," must furnish an incomparable help to such a study, and you will find this to be more and more justified at every step that we shall take; and I cannot but call your attention to the fact that almost all the misunderstanding of Kant is rooted in the underestimation, if not in the entire neglect, of the perceptive element in his method of thinking. The special, predominant power of imagination which we have seen to be so significant of Kant's intellect, is at the same time characteristic of his philosophy,—which is something far more concrete and tangible than people usually give him credit for, and which to be understood must, if I may say so, be seized quite as much by the eye

as by abstract ratiocination. It is true that the man shuts his eyes to the outside world, and so the figures of which he makes use often lack brilliancy, though, as you have seen by the *focus imaginarius*, they are never wanting in sharpness; but, in spite of all, his investigation of the soul is no logical ratiocination, no juggling with words, as he more than once contemptuously says: this is, indeed, true perception. It was undoubtedly this fact which attracted Goethe to him, and led to the saying that to read a page of Kant was like entering a brilliantly lighted room (G. 9, 173). But our professional metaphysicians, with the exception of a few men in whom a reaction is beginning to take place, have remained mere quibblers: our schoolmen still rule the roast in every camp, and not least where there is a semblance of connection with physics, experimental psychology, statistics, etc.: and so it comes to pass that we find a vast difference between Kant's methods of thought and almost everything that we meet with under the name of philosophy. I am bound to call your attention to this at once, and I can do so without going beyond the limits of our subject; on the contrary, it will enable you to appreciate the gulf which separates the perceptive from the abstract method.

Like their forerunners in the Middle Ages our modern philosophers revel in definition: and yet there is no greater mistake than to assume, from a logical point of view, that the sharper a definition is the better it is, and the more value it possesses. This does not even hold good in mathematics. For a definition in mathematics is either an arbitrary suppression of perception in favour of a practically applicable construction—such, for instance, as “a point is that which has neither parts nor magnitude,” or, “a line is that which has length without breadth,”—or else it means nothing more than a convention as to the technical expressions to be adapted to a figure with which our power of perception has made us

familiar from the outset,—as, for example, what we are to understand by the “centre” and “diameter” of a circle. In Louis Couturat’s *De l’infini mathématique* (1896), a work of decisive scientific importance, we read, *Toutes les définitions mathématiques sont purement nominales, et par suite présupposent toujours le concept qu’elles ont l’air de construire* (p. 342). And if we go a step further we find Pascal telling us that geometry is incapable of defining any single object with which it deals, such as motion, numbers, space (*De l’esprit géométrique*, sect. 1). Thus even in mathematics it is practical applicability that alone counts. As regards nature, however, the more a definition is considered, the more we find that it relates exclusively to a word and not to a thing. For instance, a leaf is a thing which every man knows by perception : try to define it and you will be running your head against mighty difficulties. Claude Bernard, one of the most important empirical investigators of the last century, affirms that : *On ne saurait rien définir dans les sciences de la nature ; toute tentative de définition ne traduit qu’une simple hypothèse*. And in another place he says, *dans toute science les définitions sont illusives*.⁷⁸ Botanists have learnt this to their cost. Under the influence of Goethe’s doctrine of metamorphosis they tried to get out of the difficulty with “the leaf in its transcendental sense” ; the attempt led to nothing but confusion.⁷⁹ Then when the word leaf would no longer serve their purpose, they took refuge behind the word *phyllo*m. The ancient languages are continually working wonders for us : the primitive Germanic root *blō* means blossom as well as leaf, and shows how our ancestors of old forestalled their great son ; yet the substantive *phyllo*m, derived from the Greek word for leaf, and conveying no meaning to our living ears, gave rise to more and more juggling with words. Then the artists in definition set to work, and with the help of the cleverly invented

phyllom soon set up a very plausible classification, according to which there were to be Phyllophytes (leaf plants) and Thallophytes (leafless plants), and the latter were to include the algæ, fungi, and lichens. It certainly was always difficult for the average man to understand why the algæ were to have no leaves, and now that the material for observation has assumed such gigantic proportions and has been subjected to more accurate investigation, the untenability of the definition, however greatly it may be extended, is fully demonstrated. To be sure we still speak of thallophytes, because it is a word of practical utility, and because our actual knowledge of algæ, fungi, and lichens in no way depends upon a name : still, if you look up Goebel's *Grundzüge der Systematik* (Fundamental Features of Systematization), you will read that "we can apply the conceptions of leaf and stem in their case as well as in that of the higher plants."⁸⁰ If we wished to set up a reaction, and to limit the artificial expression phyllom in the strictest possible way, it would render us no further service, for it would then afford little material for observation, while it would separate by main force where no separation exists ; in short, it would become a mere word ; if we take the other alternative and keep on extending its signification it must lose all informative value, gaining indeed a wealth of material, but beggarly poor in conceptions, and so again a mere word. If the phyllom-less plants are also to possess phylloms like the others, then we had better turn our attention to other things. Definitions, as you see, far from possessing the importance of foundation and corner stones in the observation of nature, as the philosophers would have us believe, are simply technical means of mutual understanding which, if they are to have any value, must be taken in such a manner as to have a rather vague or, if you prefer to call it so, an elastic application to the subject under observation.

Of course if a system is purely mental, your philosopher may go on spinning definitions as merrily and as keenly as he pleases ; but the net result will be nothing more than a great calculation in algebra where, if all goes well, everything may be accurately correct even though the letters a and b , x and y , should still remain letters and not concrete values. This is what Kant calls "building houses of cards and chatter." On the contrary, in any truly scientific system of philosophy based upon facts it is entirely contrary to reason to expect that the same expression should bear exactly the same logical meaning in every connection in which it may be found. What never changes is the point of view itself ; but the mutability of definition shows clearly that we have to deal with a living power of intuition, and with a nature which defies all adequate comprehension, in contradistinction to logical and arbitrary lectures from professorial chairs. Kant rightly observes, "Philosophy-mongering would be in a sad plight if it were unable to deal with an idea until it should have been defined," and he confesses to the following principle to which I wish to call your attention at once at the beginning of our work in common, "In philosophy definition, as conveying deliberately measured lucidity, must be the end rather than the beginning of a work."⁸¹

I have inserted this observation in order to impress upon you the fact that Kant the thinker never strays beyond the bounds of a visible and tangible world, thus standing in sharp contrast to all the logic chopping of the schools : I wanted, moreover, at the outset of your studies to warn you against attaching too much importance to definitions, and against giving ear to objections raised by pedants on this score ; urging you on the contrary to trust to Kant's guidance, and to enjoy a clearer understanding of him than you had expected to attain. "We can often speak with abundant and precise knowledge

upon a subject without being able to explain it." This is Kant's answer to the philosophers who would fain have men enter upon the field of their systems through a gateway of the most abstract ideas.⁸² We may then, with the help of concrete examples, discuss experience and idea without having attempted any precise logical definition of either. It might be philosopher-like, but it would be quite senseless and unscientific if we were to attempt to describe before we have seen, and to winnow before we have gleaned. In the course of these lectures we shall often return to experience and idea: I hope so to arrange matters that your knowledge may grow and grow until our present standpoint shall seem to you no more than the lowest rung of the ladder: yet true knowledge, in contradistinction to mere learning, is a fact, and for facts we can only prepare ourselves by action: what is to bear fruit to-morrow must lie hidden in the mystery of to-day. Later on Plato and Kant will be your study, and in them you will find if not everything, at any rate a goodly store of what is needed for the "completion of your work with exact lucidity."

Since we have been led into the question of the value of definitions, together with that of philosophy working on logical and theoretical lines, I should like to add another point of view which is closely bound up with our present investigation into experience and idea.

You have seen that Kant appeals to Plato in order to re-introduce the word "idea" in its old signification. He does this with a full sense of its importance, rejecting on the one hand the bungling emendations of this good old word, while on the other he is shy of "coining new words." Yet the use of the word "idea" in Kant is based upon an analysis of the human intellect, for which the Greeks had not the smallest inclination. That is why idea in Plato and idea in Kant do not correspond, but rather act as two symbols pointing to the same

hardly expressible meaning. This will not become quite clear to you until we reach the lectures upon Plato and Kant. But there is one thing that you can understand at once, which is that Kant's conception of "idea" is so rich and so defined that he deems it necessary to distinguish between ideas that belong rather to perception and those which belong rather to abstract thought: the former are the true "ideas," the latter he calls ratiocinations (*Vernunft Begriffe*). But no sharp distinction is possible: the only important matter is to call attention to the directions in which the human intellect moves: it sometimes happens that Idea and Ratiocination, in accordance with the suggestion of the moment, can be placed in direct opposition to one another: at other times they may be so entirely synonymous that Kant sometimes makes use of the one word for the other, incurring no little abuse on that account. Wiseacres who look upon a single word as if it were a loose coat which they try to tailor into a tight fit with the scissors of hair-splitting definitions, reproach Kant with obscurity, inconsistency, and confusedness: he had no notion of definition, he contradicted his own definitions, etc., and yet it is a simple case of perception. In the case of the idea of metamorphosis you have seen clearly how far that idea is at the same time capable and incapable of being perceived. At one time Goethe saw his *Urpflanze* (primitive plant) "with his eyes": then it was idea: at another time he speaks of an "abstract entity," then it was a ratiocination. It sometimes happens that in the consideration of an idea our attention is specially claimed by what is abstract in it, and then it is just as important to distinguish between the ideal conceptions and the true conceptions (or ratiocinations, *Verstandes Begriffe*, as Kant calls them) as it is to separate the symbolical images which are the result of ideas, from objects seen in actual experience. It is therefore important to protect

the fact of the formation of ideas against misapprehension and misuse, and to insure this it will be well to hoist a danger signal against both. Hence the definition, "a conception which goes beyond the possibilities of experience is either an idea or a ratiocination." That a single word did not suffice was not because this princely intellect possessed less consistency and clearness than any first-class private tutor, but because it was no mere logical shadow, but the embodiment of an idea, a highly complex idea, which was at stake: and so two words were required to do what might have been the work of one, whether in world-wide expansion or imprisoned as in the grip of a vice.

We have now made it clear, without any further need of discussion, that "the senses cannot furnish us with any object which shall correspond with the idea formed of it" (2 V. 383), and moreover that "in experience it is impossible to arrive at anything which exactly coincides with ideas." Goethe himself later on confessed in a happily inspired moment: "the idea cannot be represented in experience, indeed it hardly admits of proof: if a man does not profess it no amount of ocular demonstration will make him master of it." But there is one thing to which I must again draw your attention before we close the chapter on experience and idea for which the conversation between Schiller and Goethe has given such an opportune occasion. We must treat of a special contrast which exists between Kant and Goethe.

Goethe believed himself to be so entirely wrapt up in the objective perception of nature, that until Schiller roused him up he was even unconscious that he possessed ideas. As a matter of fact, however, his conception of nature consisted, before the meeting with Schiller as well as after it, chiefly in the fact that he was actually dominated by ideas. It was the intense power of perception, and not the minutiae of experience, which constituted

his special gift and directed his aim. This is a subject as to which we are still not a little hazy. I have quoted Goethe's own words to the effect that his sight was not keen. It is true that as the occasion arose he would work with the microscope and even embark upon experiments upon the influence of coloured light upon the growth of plants, but he had no time for minute observation which gave him no pleasure, and for which he had no special aptitude. On one occasion he confesses, "I had no sense of what is positive, but insisted upon everything being explained if not intelligibly, at any rate historically." Only consider his discovery of the intermaxillary bone. The discovery was due to no patient work, but was simply a declaration of Goethe's from the very beginning that it must be there. He started from an idea, from the idea of uniformity in the structure of the skeleton of the vertebrate animal, and it turned out to be right. Yet every serious and capable naturalist will agree with me in the contention that the essence of modern science lies in the rejection of all such apodeictic prophecies, and that it only accepts as valid the decisions of experience. Goethe was a brilliant genius, but in spite of that he gave rise to no little confusion by his uncritical jumble of experience and idea, and by his not always happy play of imagination. For instance, Goethe's endeavour to refer the whole of the organs of plants to one idea "leaf," proved to be as incapable of being maintained as it was fruitless. It needed no less than five ideas, Thallome, Rhizome, Caulome, Phyllome, and Trichome, to be set up in order to shelter his metamorphosis and obtain from it some slight service to science.⁸³ The dogma that the framework of the skull is built up of vertebræ made confusion worse confounded; not that the idea might not be highly stimulating, but because it went ahead of observation which later on showed that one part of the cranium of vertebrate animals proceeds from

formations of the dermal skeleton, while another part corresponds with the branchial arches, so that the analogy with the vertebræ can at most apply only to a portion and not to the whole of the skull. Moreover, the origin of this particular portion is so obscure that it is rather an academical question for Zoologists than a fact contributing to the advancement of science.⁸⁴ Goethe himself admitted later, "in my method of investigation, of knowledge, and of delight therein I am entirely dependent upon symbols."⁸⁵ This is not a method for any one else to copy: it would shatter all science to shivers. With Goethe, indeed, the case is different. He is not dealing with science pure and simple, but with that world of the eye whose function it is to be to give a new form to the whole aggregate of barbaric knowledge in the interest of civilised culture. I shall return to this point in the next lecture. Kant, the man who was so chary of directing his glance upon the world around him, and in whom one might in consequence presuppose a preference for the world of ideas, was far more jealous of the rights of experience, as opposed to idea, than Goethe. One of the most prominent results of Kant's analysis of human reason consists in the sharp distinction which he draws between experience and idea, and in the proof that "in the consideration of nature experience arms us with the rule and is the source from which truth springs" (R. V. 375). Let there be no misunderstanding as to this. The high importance which Kant attaches to practical ideas for the life of man, cannot be altogether unknown to you: according to him, "they are always in the highest degree fruitful, and indispensably necessary so far as real actions are concerned" (R. V. 385). We see by the example of the *focus imaginarius*, alluded to above, how indispensable he holds theoretical ideas to be for science, and in his *Critique of Pure Reason*, and his *Critique of the Power of Judgment*, we are led to important expositions

of the law according to which we men set up genera and species,—of the meaning of teleology, of the finite and infinite nature of the Cosmos, etc. There can be no question of any misunderstanding or disparagement of ideas. No one would have been more pleased than Kant to subscribe to Couturat's dictum, *Les idées sont le fondement même de la réalité*,⁸⁶ "ideas are the very foundation of reality." What really constitutes the contrast between Kant and Goethe is that Kant always without reserve recognised the inexorable power of concrete facts, and therefore subjected ideas to a far keener analysis than Goethe did, who although in theory after the conversation with Schiller he recognised his mistake, nevertheless remained to the end of his life inclined to reckon as natural experiences ideas which he had not even clearly formulated. If we may trust Eckermann's memory, Goethe said, as late as 1827: "I discovered the law of metamorphosis" (G. I, 2, 27). And he continued to look upon the indescribable and unthinkable idea of metamorphosis as an analogy to those laws of motion which have been arrived at by accurate observation; he never rightly understood the difference between his method and that of exact science.⁸⁷ Kant's confession of faith, on the contrary, was—"outside of experience no evidence of truth is to be found"; that is at once the confession of all exact science, and the banner under which free men go out to war against Obscurantism, against Dogmatism, against Superstition. In the whole history of the world down to the present day no philosopher has represented the inalienable rights of experience with such assurance and so convincingly as Kant. No wonder the more important naturalists side with him. Not only has he maintained our right to open our eyes, and proved with the sternness of a philosopher that the walls which are for ever being raised in the name of morality and religion against freedom of research and freedom of opinion, are

really bulwarks of prehistoric dishonesty and heathenism incarnate,—but he has laid the greatest weight upon warning us against enemies hidden in the twists and turns of our own brains. That is the end and aim of all his labours. Idea and theory and system are all to be enlisted, but as mediators and helpers, not as founders and rulers. Criticism such as this necessarily leads to a series of limitations and to the mapping out of the frontier lines of experience. Far be it from us to mistake our ideas and hypotheses and theories for experience, not even when we see and are compelled to admit that no experience would be possible without them. In this way the conception of experience is made clearer, though at the same time its boundaries are more and more closely drawn. Experience is stripped of the impertinent fribble of impotent materialists, and taught that so far from leading to anything and being a sort of divinity, it is nothing but the handmaid of a despotic and creative intellect, of “the magician king in the Tower.” But even the King must learn modesty; for it is only in experience purified in this manner that the “fountain of truth” gushes forth, that fountain which alone “supplies the evidence of truth,” and “furnishes the law of truth.”

The gist and trend of Kant's *Critique of Pure Reason* would justify us in entitling it the preparatory school of pure experience.

The contrast between Goethe and Kant is patent. But if I have been unable to avoid trenching upon the field of theory, I must ask you to concentrate your thoughts to-day upon the innate and purely personal method of perception. This is the one thing that is of first and constant importance; every system contains a multitude of impersonal elements, and might be differently formulated in every succeeding century. But if we were merely to lay stress upon what differentiates the two men, we

should only have achieved half of our task, and should have acquired nothing more than one of those popular flat pictures, with everything either to the right or to the left, which to me are hateful: in order to obtain a solid image the third dimension is needed,—that of depth. The distinguishing difference to be observed in the two men is this,—that however much they may have been apparently opposites in their natural faculties and in what they achieved, they were none the less aiming at the same goal, and that goal was the encouragement of perception as against the claims of abstract logical thought. Goethe strives to promote perception by insisting upon the value of idea, which, as he says in one passage, “unlocks the inner sense of the observer.”⁸⁸ Kant promotes perception by laying stress upon experience, and by an exact criticism of the very complicated conception which we call experience.

This I think will have given you an exact appreciation, far better than the worthy Eckermann ever possessed, of what Goethe meant when he uttered the memorable words, “Instinctively I followed the same road as Kant.” We only begin to understand any idea, when we recognise that there is more in it than can be expressed in words. Judgments are just as much symbols as words when they refer to something living. It is impossible to understand the meaning of “I followed the same road as Kant,”⁸⁹ until we see that Goethe might, at the very same moment, have said to some other man, “I followed a different road from Kant’s.” True wisdom can never be imparted: the most that can be done is to lead up to it.

For the purposes of this lecture I will now sum up the result of our comparative study of these two conceptions of idea and experience in the following way: an eye that is always receiving images, is at the same time like a mirror always reflecting them, and gathers its own

ideas in the garden of nature in the full confidence that they grew there. That was the case with Goethe :

O lass sie walten,
Die unvergleichlichen Gestalten,
Wie sie dorthin mein Auge schickt.*

No such mistake found a place in Kant's carefully locked brain : no light from without could blind him, and so he was able to draw a fine distinction between the outer world and the inner world,—defining in the workings of the human intellect how much is foreign and how much is inborn,—discriminating in comprehensible thought between matter and form. Unless Kant had possessed the special and phenomenal power of conception to which I called attention at the beginning of the lecture his equipment would have been inadequate : in order to take a world with its problems into consideration, a man must be able to lay claim to the possession of that world as his own : but had Kant been as completely wrapped up in nature as was Goethe, he would never have succeeded in perfecting that series of judgments to which mankind will always be compelled to revert in the interests of true science and true religion.

But beyond this abstract conclusion there is a moral which I would fain draw out of these considerations of ours ; and that moral is,—if we give ourselves up to nature exclusively we lose ourselves in her. No one knew that better than Goethe. There is a passage in which he says, “ the idea of metamorphosis is a very lofty, but at the same time a very dangerous gift from above. It leads to that which is without form, destroying and disintegrating knowledge.”⁹⁰ In spite of this, even in his old age he was constantly relapsing into the mysticism of his youth. There can be no doubt that mysticism as a mental condition, and as a presentiment

* O let them prevail, these incomparable forms, seen as my eye transmitted them.

of transcendental worlds beyond our ken, is an intellectual phenomenon worthy of respect : sometimes it has even pointed the way to liberation from the chains of Dogma ; in spite of that, as a mental disposition, it is to be held in abomination : the most brilliant intellect becomes childish when it strikes off on this wrong tack. Here again the great Kant is our deliverer for all time ; nothing but true criticism such as he taught can steer us clear. Unhappily, in spite of the purifying influence of Kant, Goethe never was able to hold fast to the critical position for any length of time. He mourns over his fate as having been " born to the school of identity,"⁹¹ and a few years before his death he writes the regrettable words, " Matter can never exist without mind, nor mind without matter,"⁹² and the man who wrote this was the same man who a few years earlier admitted that the mere idea of transformation was dangerous and fatal to knowledge. Dualism is no theory, but a fact. It would no doubt be very pretty if we men instead of having two legs had only one : but as a matter of fact we have two, and are compelled to step out with the right and the left foot in turns, if we wish to go forward. All monism, be it what it may, leads in the end to a Buddhistic contemplation of the navel. If subject and object be one and the same, there is an end of all activity, whether of science or of soul.

Goethe's genius naturally saved him from such a shipwreck as this. This noble man was rich in those contradictions in which true greatness reveals itself, and of which it is as prodigal as its mother nature. Of that you have just had plenty of evidence. Still more was he inspired when, instead of proclaiming his belief in a flat identity, he uttered the immortal saying, " where object and subject are in contact, there is life." Even though now and again he maintained that his " thinking was perception "—those are his very words—" and was actually fused with the objects perceived,"⁹³ there were other

moments when he admitted that man must act as a law-giver,⁸⁴ even in the presence of nature, and that is manifestly the very opposite of "fusion"; indeed, upon one occasion he said that "all attempts to solve the problems of nature, are really only the conflicts of the power of thought with perception."⁸⁵ The revelation of the essence of this inevitable conflict, was precisely what constituted the life-work of Kant. Even those least familiar with philosophical disputes can have no difficulty in understanding on the one hand the advantage of determining by analysis what part the "lawgiving" thought of man plays in purely objective perception,—and on the other of showing how far perception in the first instance furnishes thought with material, and so points the way for the "lawgiver." There is no other possible way of arriving at a clear distinction between experience and idea.

To the best of my ability I have now in the main accomplished the task which I set myself in this first lecture. Yet I must not conclude without briefly directing your attention to another field of perception with which I shall deal more fully in my next discourse: it is one in which the comparison between Goethe and Kant is so instructive, and such a valuable supplement to the knowledge that we have already gained, that it cannot be passed over in silence to-day. I am speaking of mathematics.

The science of mathematics, to borrow a saying of Goethe's, is that form of perception which is altogether and exclusively the monopoly of the "lawgiving" thought of man. Across that bridge of the eye to which I alluded at the beginning of my lecture there come images from without which man is not capable of inventing, and of which we are only aware when nature presents them to us; but, in the Magician King's castle there is also a world of forms,—forms which

have no special relation to this or that real entity, and yet related to everything or nothing, rods and cranes and edges and angles, forms of which outside nature knows nothing, or at any rate knew nothing until this world of human phantoms had come into tangible existence in the shape of machines.

“ They see thee not for they see nought but phantoms,” says Mephistopheles of the “ Mothers ” ; these mothers are our mothers,—the mothers of the human race : it was from them that we inherited our grey brain-substance, and this is the Archimedean point, whence, as it were outside of nature, we spread over the Cosmos the net of mathematics,—mathematics out of which rise order, abstract form, disruption, self-mastery, lawgiving, to be embodied in human science.

We shall have to go more closely into this hereafter. To-day we need do no more than determine the directly contradictory estimates formed by Goethe and Kant of this human invention called mathematics. Kant's declaration of faith runs thus : “ Pure mathematics afford the truest appreciation, and are at the same time the model of the highest certainty in every field of thought ” (D. § 12), and he not only admires but loves the science of mathematics to such a degree that he considers that “ it stirs our feelings in a similar, or even more sublime, way than the accidental beauties of nature.”⁹⁶ Goethe, on the contrary, who has to admit that “ division and addition did not lie in my nature,”⁹⁷ was of opinion that “ since the revival of mathematics, science has gone sadly astray.”⁹⁸ Goethe was not only without any turn for mathematics, but he really showed very little understanding of the essence and practical importance of the science : Kant himself was no arithmetician, though he had a pre-eminent aptitude for mathematical perception. Here it was Goethe whose eyes were closed, Kant whose eyes were open ; and these same open eyes of his enabled

him to succeed in rearing up a work of real genius, a construction for all time. We may no doubt affirm without exaggeration that Kant's hypothesis of the origin of the heavenly bodies, taken up forty years later by Laplace and carried out into greater detail with the help of calculation, was one of the eminent results of genius in the exercise of the human power of perception.

There is no need to enlarge upon what is a matter of common knowledge. You are acquainted with this hypothesis of an originally undifferentiated, chaotically nebular, primary mass of matter which owing to the attraction and repulsion of atoms acquired circulation, by means of which a central body was formed, and around that again others were collected, until all or at any rate the greater number of the suns (for some of these are still in a nebular state) came into existence; round the suns came their planets, and round the planets, rings, moons, asteroids, etc. Kant calls his hypothesis "an attempt to arrive at the mechanical origin of the whole structure of the universe," and this attempt was so brilliant that it still prevails in almost all theories both within and without the domain of exact science. I am, however, concerned to lay great stress upon the fact that we are not dealing here with a "theory" in the sense of the laws of motion set up by Newton and Descartes, but with a spontaneously creative hypothesis. Its perceptibility is so powerful and so convincing that even men of science sometimes overlook this fact, and so the whole essence of Kant's achievement is misunderstood. In truth, as the mathematicians teach us, it becomes daily more clear that the hypothesis in question, whether in the form given to it by Kant or later by Laplace, again by Hervé Faye, or recently by J. Mooser, cannot be absolutely maintained in all its details, and never will be capable of actual proof. It is no theory, but an hypothesis: it

forces into its scheme irreducible elements in order to make the whole comprehensible: here and there, as in all hypotheses, either facts or calculations are treated very cavalierly. Lord Kelvin's calculation that if the whole earth had been originally made of solid steel it would by the velocity of its rotary motion have undergone almost the same flattening at the poles as exists now, and which according to Kant is generally explained by the admission of a gaseous condition prior to its liquid condition,—is among those things which have given rise to serious reflection upon the audacity of trying to make realities out of possibilities. Recently we have had a new hypothesis which is preferred by such eminent geologists and physiologists as Geikie, Nordenskjold, Ratzel, and others, according to which the heavenly bodies have arisen out of the combination of solid masses of dust and stones in cosmic space round special points of attraction. It is calculated that on an average about four and a half million hundredweight of meteorites fall in the course of a thousand years upon the surface of the earth out of interplanetary space. In an article in *Petermann's Mitteilungen* (1901, p. 217 seq.), Friedrich Ratzel comes to the conclusion that Kant's hypothesis is "not to be looked upon as the only, and in a certain sense, inevitable, hypothesis of the formation of the earth. Geography has in itself no ground for holding a primitive vapour and a consequent condition of fluid incandescence of the planet to be more probable than the aggregation of small heavenly bodies in various stages, out of the union of which, accompanied by heat, the earth and other heavenly bodies might have been started." The consideration of such previously unsuspected possibilities deprives the nebular hypothesis of Kant and Laplace of all dogmatic value as truth, and gives it more importance than what it really is, namely an ingenious result of the human intellect legislating for and

dominating the whole notion of the universe with the freedom of a creator. That same analytical and constructive gift of imagination which you saw at work in the case of Westminster Bridge, here reaches boldly up to the stars and cries out, "Do but furnish me with matter, and out of it I will build you a world" (H. Vor.).

This method of perception, and consequently also this method of thinking, is as unlike Goethe as possible, for he would have had no use for abstract matter conceived as set in motion in accordance with physical laws.

Here let me impress upon your closest attention what follows. The results at which we have already arrived have taught us that little information is to be gained from the general glimpses of the character and intellect of a man : unless we follow up our analysis, we only feel the burthen of a new fact, without soaring upon the wings of a new revelation. The contrast between the two methods of perception, that of Kant and that of Goethe, which has been brought into prominence in the consideration of mathematics and schematic observation, is joined to an unexpected, apparently paradoxical and psychologically very instructive judgment. Kant's theoretical methods of thought are clearer than those of Goethe. This hypothesis of Kant's as to the mechanical origin of the world's structure is much more intelligible, and, as being the result of actual sight, much easier to explain, than Goethe's doctrine of metamorphosis : and for this reason : Kant reduces a concrete observation, the world of stars, to a scheme—therefore equally to something directly perceptible, to something geometrically perceptible ; Goethe, on the contrary, searches for an idea which perception has awakened in his reason, a symbol : the idea itself "transcends possible experience," and the symbol, while borrowing something from the faculty of perception yet extends beyond it. The pure thinking in his consideration of nature remains within

the pale of possible perception, whereas the man who possesses the genius of observation attempts to surmount that pale. If the pure thinker adds perception to his thought, then his observation will be incontrovertible, absolutely human, and I might say logical. If a man who possesses the genius of observation succeeds in attaining theoretical reflection, then he will have something to impart which, being beyond the scope of logic, can only be expressed by indications, and will become indistinct and often full of contradictions. This is why Kant's teaching is clearer and easier to grasp than that of Goethe.

This much more is worthy of observation. The intellect which thinks mathematically and mechanically, that is to say, which takes its stand upon the idea of the "lawgiver," faces the incomprehensible universe with its tables of the law, and forces its scheme upon it, while the priest of the eye preaches blind submission to perception, that "quite peculiar method of investigation" which Goethe calls "the interrogation of nature."⁹⁹ Instead of, like Kant, forcing the whole Cosmos within the human soul, this interrogation of nature takes man out of himself and throws him into the arms of nature. Here the road leads to the mystic union with nature, to the state of the superman, the state in which the strong man who possesses a sure foot and an eye that never grows giddy can reach the highest pinnacle. "If thou darest thus equipped to climb the last stage, give me thy hand and open thine eyes upon the wide field of nature." But it is a state in which those who in their mad audacity dare to venture unprepared, not reaching out their hands for the support of true genius, but trusting to the vain rhetorician or the mystical fanatic, must inevitably take the fatal plunge into the abyss. Where Scheme exists no such vital danger lurks. True it may easily turn insignificant men into machines; but what of that? In the

hands of the more gifted it becomes "the pride of the human intellect," as Kant exclaims in a moment of characteristic inspiration (R.V. 492). With the confidence of indifference it extends or compresses and mutilates every living form, every phenomenon of nature, till they fit into the Procrustean bed of lawgiving, purely human, mathematical observation; it creates vessels and organs for the increase of science which may become the common property of all mankind, even of the less gifted; and in virtue of the great share of arbitrary power which man has added to it, it is easily understood, convincing, and rich in results.

I have finished. I refrain from summing up the results at which we have arrived, all the more willingly inasmuch as we shall more than once be obliged to return to the same subjects in the next lecture. In the person of Leonardo da Vinci we shall have another man belonging to the world of the eye, whom we may place in contrast with Kant. It will, however, be seen that Leonardo differs from Goethe no less than Kant does: and so we shall arrive at making a distinction between eye and eye. We shall be startled to find Goethe as seen from Leonardo's point of view approach very near to Kant in regard to certain shortcomings of the eye and the dominant power of thought,—and to find Leonardo the absolute artist, seen from Goethe's point of view, in certain important matters much more closely related to Kant than to the poet who was so rich in ideas. And so little by little the wealth and peculiar characteristics of Immanuel Kant will be unveiled before us, and by degrees we shall gain the power of penetrating into his thoughts. I hope that we have this day laid a good foundation for our further labours. We owe it to Kant to know no rest until he stands as a living personality before our eyes.

LEONARDO
CONCEPTION AND PERCEPTION

WITH AN EXCURSUS UPON PHYSICAL OPTICS
AND THE DOCTRINE OF COLOUR

Our soul is composed of harmony,
and harmony is never bred save
in moments when the proportions
of objects are seen or heard.

Leonardo.

Univ. of
California

VINCI
LEONARDO



LEONARDO DA VINCI
Painted by himself
Drawn and engraved by Charles Townley

LEONARDO

THAT Seeing is a passive as well as an active function is a maxim as old as Aristotle. But the difference between passivity and activity in different men repeats itself in the degree and the more delicate qualities of both. It must be our business to bring into relief those personal peculiarities of Kant's way of Seeing which differentiate him from other Seers. It is with this object in view that we resort to comparison. We desire ourselves to observe and *See* the most important of the *Seers*, in the profound conviction that this will carry us further and to greater advantage than if we were to go into abstract theories about them, and hedge in their doctrines with finely pointed fences of definition.

From our first comparison,—that with Goethe,—we have won a significant and lasting advantage. The intellectual individuality of Kant revealed itself in striking contrast to that of Goethe. In Kant we saw a peculiar quality of intuition developed to an absolutely astounding degree. We saw the power of appreciating mentally that which has been described: and that which is described is something which has been brought to our minds parcel-wise, or, to use the technical expression, analytically: for it is only by degrees that words can present a Whole, whereas the Eye first gives us a Whole, and only by degrees separates it into Parts. Moreover, in Kant we found an important development of that method of perception which is projected from within to without, geometrically in accordance with formula, humanly

speaking creative,—namely the mathematical method. In Goethe, on the contrary, we found as a characteristic the insatiable hunger of the Eye, and in connection therewith the impulse to treat even matters of theory as something actually seen. In spite of this, inasmuch as the Doctrine of Metamorphosis had furnished us with a clear demonstration of the relationship between passivity and activity in Goethe's manner of Seeing, we recognised its harmony with Kant's mental vision and his analytical distinction between Experience and Idea.

To-day I wish to carry this comparison with Goethe further, for it still contains a whole store of instruction. I hope to convince you that without the help of Kant we could hardly succeed in correctly grasping Goethe's view of nature, while at the same time no other man leads us so directly and patently to Kant, as does Goethe. This consideration, then, will give you a twofold advantage. Still, I wish to associate with these two men a third,—another great artist. I hit upon my choice without any reference to chronology;—simply with the intention of avoiding the ever-present danger of allowing our lazy thoughts to crystallise, and of contenting ourselves with some idle phrase about the antagonism between art and philosophy. Unfortunately no lesser man than Schopenhauer has given encouragement to so stark a fallacy: he is the most read of all philosophers, and in so far justly as he is by a long way the most readable; pity, that among his many perversities of thought, (I can find no other word for them,) there should be the asseveration that "Genius and a head for mathematics" should be contradictions.¹ It is not possible here to enter upon a refutation of this detestable asseveration, to which, in the very first place, the whole phenomenon of Hellenism would have to fall a sacrifice: it would be easy and entertaining to carry out such a refutation with no other help than that of Schopenhauer's own writings:

but one feels almost ashamed to enter the lists against this much too clever man when one hears him in an important passage cite Alfieri as having been unable to master the fourth proposition of Euclid, and again bringing forward some unnamed French mathematician who, on reading through Racine's *Iphigénie*, shrugged his shoulders, and asked, "Qu'est-ce que cela prouve?"² If those are arguments then one might, with equal force, come to the conclusion that because a certain nineteenth-century poet at the age of forty, and in spite of living in the country, did not yet know that tadpoles turn into frogs, therefore no Poet is gifted with the power of observing nature. The mischief of such phrases, when they are presented with the seductive eloquence of a Schopenhauer, is that they are scattered far and wide, and establish themselves as dogmas, and so it comes to pass that to-day we find many men who because, like Alfieri, they are incapable of something, pose as men of genius, and who, not content with the fact that "the pride of the human intellect," as Kant calls mathematics, is none of theirs, plume themselves upon their impotence. Nay more, these mental waifs who cannot even grasp the simple problem of the equilateral triangle, look down from the height of their superiority on the most important men if only they show any aptitude for mathematics, and catalogue them as second-rate goods. But we need not dwell upon this, though it is difficult to prevent our wrath from blazing up over the impertinence of so fundamentally perverted a dogma. It is time for us to enter at once upon the heart of our subject.³

Schopenhauer's thesis affects genius in general. Sometimes, however, he propounds it in a narrower and therefore more plausible form: in this sense he writes, "Experience has proved that men of great genius in art have no aptitude for mathematics." That is an important limitation, for even in his eyes it is not the

artist alone who can lay claim to genius: indeed, he is fond of quoting himself as an example, and certainly he had no artistic sense. Nevertheless this contention, which is to be found in the thirty-sixth paragraph of the first volume of his principal work, is so fundamentally false, that one asks oneself how Schopenhauer could have been blind enough to let it stand unaltered from the year 1818 to the day of his death. If we only think of German artists, the very first that comes to our thoughts is the man who was so specially admired even by Goethe, the great, the only, I had almost said the holy, Albrecht Dürer. He is one of those great "men of genius in art" of whom one can say that they were the beginning and the end and the culminating point, all in one. Of course historically they spring from what has gone before, and they lead to what is to follow after, but that association hangs about their noble forms like a mantle. Like the goddess from the sea-foam, the individual rises out of the mass, something new, something incomparable, that never was before, and never can be again. At the sight of such men we are struck by Schopenhauer's fine saying, "Art is everywhere triumphant." Perfection it is that blazes out upon us out of all the feverish struggles of these artists,—Peace that smiles upon us, full of trust, and resting from the hurry of the eternal strife for something higher. And where labour and thought and prayer have wrought together as tireless journeymen, there at last reigns Harmony, divinely restful, incapable of failure. Among these giants is Dürer—and mark this. Not only had he an aptitude for mathematics, but that aptitude was something quite out of the common. Dürer is the author of the first textbook of applied geometry in the German language! Besides that, he devoted a whole work to the hopelessly dry, and only mathematically interesting, subject of Fortification; and his lectures on the proportion of the human figure are a little miracle

of intricate geometrical descriptions. In his partiality for mathematics, in his sure eye for the study, and the weight that he lays upon it for the educational equipment of the artist—as he writes, “mensuration is the right foundation of all painting”⁴—we have the special characteristic of this great artist. This one example is enough to prove that Schopenhauer’s contention that the great artist has no aptitude for mathematics is an untenable generalisation from single instances. Further, you will easily understand that I must have it at heart to refute the insinuation that Kant belonged to the class of inferior minds lacking genius, because he had a talent for mathematics: far rather do we see that the possession of that talent gives us no right to infer a lack of artistic feeling.

Now, at last, I call up the man whose radiant name I should be loath to cloud with polemics—Leonardo da Vinci. No greater painter ever lived; and this great painter was like Dürer, and even more than Dürer, a pre-eminent mathematician and mechanic. At the same time—as we see every day more clearly—a man of an all-embracing intellect, a Seer who penetrated all that his eye saw, a Discoverer so inexhaustible that the world has perhaps never seen his like, a deep, bold Thinker. Let us compare his method of Seeing with the methods of Goethe and Kant: that, I hope, will save us from all future danger of the crystallisations of the phrase-mongers.

Like Goethe, this man is all Eye. He calls the Eye the window of the soul, *finestra dell' anima*,⁵ whose precious qualities he is never weary of praising; the Eye is *signore de' sensi*, “Lord of the senses,”⁶ the Eye is the Source of all Knowledge. Those who rely solely on the study of learned writings, instead of becoming acquainted with the works of Nature by means of their own Eyes, are only grandchildren not Sons of Nature, that one

teacher of all teachers. All Arts, all Sciences, all Thought, are according to Leonardo "daughters of the Eye," and so it is that the painter is *nipote à Dio*, "the grandson of God." The Eye of this remarkable man is nevertheless, like Goethe's, far from being an exclusively artistic organ,—it has also the power of penetrating the universe. A brilliant light radiates from his Eye—for it is the special characteristic of the Eye of such men that it not only takes up light as others do, but also sends out rays of light illuminating the darkness, glowing through the impenetrable until it becomes transparent. A ray of light radiates, I say, from Leonardo's Eye so brilliantly, that even the most prosaic historians must admit that in him the intuitive power of divination of this organ verges upon the fabulous. Leonardo anticipated our whole modern natural science,—that is to say so far as this was possible, relying upon the Eye alone and without the help of the higher mathematics,—which were not then known,—of the new instruments, and of the mass of observations which had to be mastered by whole generations. For example, this man who died in 1519, who had been brought up in the strict belief of the Church in a flat earth laid between Heaven and Hell, knew the principles of the Cosmic system as Copernicus developed them thirty years later. How he gained this knowledge, and in what connection it came to him, we know not. For his observations, up to the present time far from being all deciphered and published, are for the most part aphoristic, often forming an unsolvable tangle of the most various thoughts, jotted down in the midst of, or under, or across his sketches, or on the backs of his sheets of drawings—thoughts often occurring to him in the midst of his painting, which he evidently seizes in a hurry, in order to use them elsewhere. Sometimes he writes expressly, "This is how I must deal with the matter in my work," or something of the same sort: or they are

clear and neat preparations for books which he seems never to have written, and it is only from the outline that we can make a guess at the direction of his thought. So in Leonardo's writings we find no astronomical system. Yet on one sheet, under a number of mathematical calculations, we find written in unusually large letters, *il sole non si muove*, "the sun does not move."

X Not another word. Here we have clearly a sudden inspiration. But Leonardo is no visionary: his was throughout a positive intellect, never weary of seeking the *certezza delle scienze* by the strictly empirical and mathematical road. *Sperientia è commune madre di tutte le scienze e arti*. "Experience is the common mother of all the arts and sciences,"—and *nissuna humana investigatione si po dimandare vera scientia, s'essa non passa per le matematiche dimostrazioni*, "no human investigation can lay claim to being true science, unless it can stand the test of mathematical demonstration." Experiment, therefore, and calculation must be brought into court as tests of the correctness of any assumed fact. In the same way on other sheets we find a succession of investigations and deductions all circling round this central idea of a stationary sun and an earth which is in motion. Take, for instance, the important recognition *come la terra non è nel mezzo del cerchio del sole, ne nel mezzo del mondo*,⁷ "that the earth is not in the centre of the sun's orbit, nor in the centre of the universe." In this connection we over and over again find the remark that the sun is greater than the earth, together with the assertion that there are many stars that are many times bigger than the star which is the earth. *Molte stelle vi sono che son moltissime volte maggiore che la stella che è la terra*.⁸ The recognition of the fact that the dark earth reflects light leads him to the further assumption that the light of the planets is also reflected light, and that our earth seen from the moon would have

exactly the same appearance as that which the moon gives us.⁹ From this recognition there was but one step to the affirmation that the earth must be nearly spherical in shape and revolve round its axis. Certainly, so far as I know, we possess no written proof that Leonardo in any of his abrupt sentences ever gave expression to the further fundamental thought of the heliocentric system ; but a great portion of his work is as yet unpublished, and this idea of motion follows so necessarily from the tenets which I have cited, that we are compelled to accept the belief that it was known to him. If now we turn our attention from the movements of the constellations to the hidden inner movements of the body, we find that Leonardo with the help of a like magical power of vision suspected, and even had a clear idea of, the circulation of the blood. This has been denied on the ground that in one passage Leonardo compared the movements of the blood with the ebb and flow of the tide. But the objection breaks down, because the notes which we possess of Leonardo's thoughts date from the most various periods of his life, and nothing can blot out the words which we have in his own hand, in black and white, concerning *il continuo corso che fa il sangue per le sue vene*, "the continuous course of the blood racing through its veins," and over and above this that the blood which flows back to the heart, *il sangue che torna indietro*, differs from that which, when the blood is driven out, closes the valves of the heart, *che riserra le porte del core*.¹⁰ These words suffice to prove a deep insight into the mechanism of the circulation, which at that time was unsuspected and not discovered until a century later : for Leonardo knows that the blood "runs an uninterrupted course through the veins," he knows that it proceeds from the heart, and finds its way back to the heart, and he makes a distinction between the venous blood and the arterial blood. And here we must bear in mind that the most important

works of Leonardo in this connection, as in others, are up to the present unpublished. They lie idle in the dust of libraries.

I have chosen these two examples, the astronomical and the physiological, out of the great mass of material. Leonardo seems to have interested himself in every branch of science, and everywhere, through the mere penetrating power of his sight, coupled with the sagacity of his judgment, he appears to have forestalled science—often by centuries. Think only of his right appreciation of the significance of petrifications and of the geological strata at a time when people used to explain the one as the playful products of a *vis plastica*, while for the other at best the Deluge was made responsible! But to my regret I can give no more time to this captivating subject. If you want more particulars I must refer you to the books upon Leonardo.¹¹ I must be content if, by quoting typical instances, I have made you familiar with the wonderful quality and astounding penetration of this power of perception. Words are insufficient, what we need is facts—and these facts patent to every man, even to the unlearned, point to an intellect whose kinship with that of Goethe is at once striking: the same ever-open Eye, never satiated, the Eye of the warder Lynceus (as I called it in my first lecture), surveying the whole world, and uninterruptedly entertaining the monarch imprisoned in the Tower with new pictures: at the same time it is an Eye which creates. Yet we are struck by two important differences. Leonardo sees more exactly than
 ✕ Goethe, his Eye is sharper, and he can do what Goethe never could: he can reproduce what he has seen so that it becomes something seen by others: he is a painter, and for that reason still further removed from Kant than Goethe. But just as the outer sense is more refined in Leonardo than in Goethe, so it is too in the case of that inner schematic power of perception, which Goethe hardly

possessed, but which in Kant was conspicuously developed. In this respect the relationship is reversed : Leonardo is nearer to Kant than Goethe was ; in mechanics, indeed, he is as richly gifted with genius as he is in Art. Take up the six beautiful volumes into which Ravaisson-Mollien has divided all Leonardo's manuscripts in the Bibliothèque de l'Institut, in facsimile and deciphered, and you will see that nine-tenths of these notes refer to mathematics and mechanics. Leonardo never ceased to calculate. His mind was busy with the squaring of the circle, and with groping attempts at infinitesimal calculation ; from the flight of birds to the observation of a waterfall, in every direction the interest in mathematics and mechanics forces itself upon him side by side with that of the painter. In one place he speaks of mechanics as "a Paradise," and says of it, "the science of machinery or mechanics is the noblest of all the sciences"—*La scientia strumentale over machinale è nobilissima*. On the sheet which contains perhaps the very first sketch for the Last Supper, we find immediately under the subject a geometrical problem drawn and solved in ciphers, and another sheet which contains studies for the Apostles and a pathetic sketch for the Christ, shows under these figures a plan for a piece of machinery with explanatory notes. So if Leonardo and Goethe are two men in whom, in contradistinction to Kant, the Eye is the organ of life, still two very different intellects must be looking out from this *finestra dell' anima*, two very different modes of activity, to quote Aristotle, and therefore at the same time two very different systems of philosophy. Starting from the outward and visible signs we shall reach the very core of the question if we pay attention to one thing,—that Goethe wished to paint and could not, whilst Leonardo presents such a culminating point of pictorial genius, that few can reach his level, none surpass him.

Goethe's lack of capability in the plastic arts would be less striking if we did not see him from childhood so passionately striving to attain mastery in this very direction. We know that as a student in Leipzig he painted more than he read. It was Oeser's studio, not the lecture-rooms of the juristic Faculty, that he haunted. And with what touching industry did he carry on this struggle for the impossible !

Doch unvermögend Streben, Nachgelalle,
 Bracht' oft den Stift, den Pinsel bracht's zu Falle ;
 Auf neues Wagnis endlich blieb doch nur
 Vom besten Wollen halb und halbe Spur.

In the end Goethe himself was bound to confess, " I was lacking in the true plastic power," and he adds the precious words of irony against himself, " my attempts at representing nature were more like distant suspicions of given forms, and my figures resembled the light vaporous beings in Dante's Purgatorio, shadowless themselves, and terror-stricken at the shadows of real bodies." What this defect meant Goethe accurately realised ; for in a conversation with Eckermann he quotes with praise words of our Leonardo,—" If your son lacks the sense to make what he draws stand out in relief by powerful shadowing, so that one might grasp it in one's hand, then he has no talent." And do you know why Goethe had no talent for drawing ? Why his copies were mere " distant suspicions of given forms " ? Because he was deficient in the sense of Geometry. Because we men are so built that we are incapable of accurately grasping any form which nature presents to us, unless, consciously or unconsciously, we have held before it by way of comparison the complex network of possible forms which is innate in us, and have in this way assimilated that which is outside all rule, incalculable, and which has never existed, by contrasting it with that which is regular, calculated and for ever unalterable. This happens

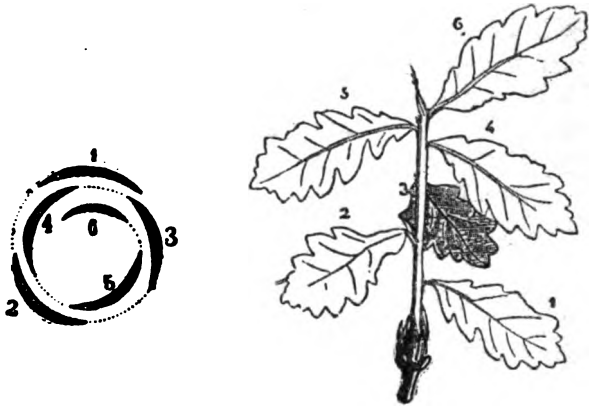
without our thinking of it during every second of our life: we are incessantly schematising. Later on you will learn from Kant to what degree our whole intellectual being is under the domination of Scheme. "This schematising of our understanding, when we are face to face with phenomena," he writes, "is an art hidden in the depths of the human soul." For the images which we receive from without, that is to say the complex of the impressions of our senses, cannot be grasped directly, but our intellect—the "activity" of Aristotle—must first, as Kant says in a happy figure of speech, have impressed its monogram upon them. "It is only by means of the Scheme that images and conception can be brought into union." You see that from without to within there is an intermediary action similar to that which takes place from within to without. Our ideas, as you will remember from the metamorphosis, were only able to reach the Eye by borrowing a symbol, e.g. the leaf, from the world of the senses: but this world of the senses—so runs the new creed—can penetrate the thinking consciousness in no other way than by the intermediary of schemes of the understanding; and these schemes coincide with the perceptions with no more exactitude than the symbols coincided with the ideas. It is not my intention at this moment to weary you with metaphysical disquisitions; on the contrary, I wanted only to call your attention to the fact that the plastic artist shows us this secret domination of the "hidden art" of schematisation in bright daylight, and so smooths the way for the understanding of one of the most difficult passages of Kant's *Critique of the Doctrine of Perception*. For the great painter, consciously and in the sight of all men, puts into concrete form that which in others exists in the unconscious "depths of the soul."

That is why Dürer wrote those words which perhaps may have struck you as strange a little while ago—"The

art of mensuration is the true foundation of all painting," and the same order of thought gives rise to what he writes on the next page: "The outer (practical) work must be the indication of the inner understanding." And in order that you may realise how powerfully the geometrical and schematic principle is developed in so pre-eminent a modeller, and how busily it is at work, I would beg you to take up another work of Dürer's, "the four Books of human proportion,"—not in a modern abbreviated edition, but in the original small folio of 1528, with all the charts and tables, as they left the master's hands. You will be astounded at the world of numbers and geometrical figures in which Dürer lived; they are enough to make you giddy. Indeed, every complication can be solved by figures, yielding of its own accord without any involving of the imagination: but one can hardly grasp how any man should have been able to carry in his head, as something visible, such complicated geometrical figures, as Dürer was obviously able to do. In the two first books the many charts of figures and the painful precision of the measurements will strike you as imposing. But now look at the third book! Here Dürer teaches us how we may at will change the fixed proportions; for instance, he takes a woman of average proportions that he has already shown us, and makes her first long and thin, then short and monstrously fat; or else he changes one part of the body, leaving the other parts as they were, etc., and all this he does without ever departing from the established foundations of geometrical schemes, and with the help of instruments which he calls "the perverter," "the falsifier," etc. The fourth book is almost more interesting: it shows "how you may distort the previously described images," and yet it is no simple doctrine of perspective in our sense of the word, but rather what mathematicians call the geometry of position, bound up with that of projection. You need

only look at the figures on page Y₄, Z, and those that follow, in order to arrive at the understanding of what Dürer expects of the art-disciple.

Leonardo's brain was organised in like fashion. To be sure he was not so self-tormenting—for instance, look at his doctrine of perspective, how bright it seems by the side of Dürer's,—yet always and everywhere he paid respect to the mathematical relations, always bringing calculation into play, always displaying the geometrical Scheme between the Eye and the Object. One hundred



and fifty years ago, Charles Bonnet, the Genevan botanist, introduced the so-called doctrine of Phyllotaxy, that is to say, the exact observation of the relative position of the leaves on the stalk.

To the most widely spread form of this relative position he gave the name of *Quincunx*: in this the sixth leaf after the stalk has been twice encircled invariably stands immediately above the first; accordingly every cycle of leaves consists of five leaves. This discovery was the result of years of study by an experienced professed botanist. But two hundred and fifty years earlier Leonardo's artist-eye had observed the *Quincunx*, and

had drawn it with the most painful care, and that too in his *Book on Painting*.¹² You see with what mathematical precision the painter observed! and not only with precision, but also with schematisation, for as a matter of fact this $\frac{3}{4}$ position is only approximatively existent. But in order that you may also see the geometrician at work, I have copied here a little sketch out of Ravaisson-Mollien—(M.S. M. f. 78 overleaf). To this Leonardo has added the note "all twigs possess lines which work towards the central point of the tree." In order to understand him you must naturally only take into consideration the youngest twigs, and you must realise how this so-called central point year by year moves upwards, quickly at first, then slowly. Even so there is great boldness in such a schematisation. On other pages you will see how Leonardo was at pains to apply to the human head a similar law of relationship to the line of circumference. His comparative studies of various human heads, including monstrous deformities, are so well known that I need do no more than allude to them.*



This cursory outline may suffice to show you what special qualities must be at work in a man who is capable of reproducing that which he has seen. Where these qualities are lacking there can be no painter, because there is no organ for the correct assimilation of form, and every attempt yields nothing but "distant suspicions." Of such men who are willing but incapable, Leonardo says, *Multi sono gli uomini chi anno desiderio e amore al disegno ma non disposizione*—"many are the men who

* Leonardo drew a circle, by the help of which he fixed every point of the human head in a Scheme—nose, chin, ears, eyes, etc.

have the wish to draw and who take delight in it, but who have not the capability"—the *disposizione* lies in the aptitude for schematising. Naturally the geometrical quality by itself is not enough: yet it must not be wanting. The man who keeps the scheme steadily before his Eye, notes every deviation in the form, whereas on the other hand a Goethe, as we have seen, was rather inclined to underestimate points of difference, and in everything to see the points of union. "I was born in the school of identity," is his confession, but that is no school of painting. On the other hand, it is certainly interesting to discover that the thinker with closed eyes, whose stupendous schematic power of representation thought out the theory of the Heavens, showed in this respect a true intellectual relationship with a Dürer and a Leonardo. However much the science of mathematics may on one side root itself in logic, and signify in many of its adepts a purely abstract logical exercise of the intellect,—still the living water that gives nourishment to the tree is the power of the Eye, and so it may happen that a Kant may in certain respects stand in closer relationship to Leonardo than Goethe. In order to keep up the association of ideas in what I have to say, I shall return to this subject later, but I shall beg you once for all not to forget that the power of schematisation is a true formative power.

In the meantime we must still linger awhile over the comparison between Leonardo and Goethe. I wish to show you how far-reaching is the difference that we have here observed in the Eye at work. For this purpose Leonardo's judgments on the essence of Art will be of service to us. According to him the senses are the true agents in real art, and the man who, like the poet, excites the conceptions of the senses by descriptions alone, makes use of a subordinate and indirect species of Art. Leonardo exclaims proudly, *se 'l pittore vol vedere bellezze*

che lo inamorino egli n'è signore di generarle. That the poet is equally master of producing beauty that shall be capable of exciting his love, that Leonardo denies. For *il senso piu nobile* is the Eye, and next to this noblest sense follows the Ear, *la musica si deve chiamare sorella minore della pittura*, whereas the artist in words is only indirectly and not really an artist, because he can only produce forms by roundabout ways, and by steering clear of the impressions of the senses: *e per questo il poeta resta, inquanto alla figurazione delle cose corporee, molto indietro al pittore, e delle cose invisibili rimane indietro al musico*, "the Poet in the representation of bodily things remains far behind the painter, and in that of invisible things, behind the musician." But the strongest objection that Leonardo has to make against the poet, is *che non ha potesta in un medesimo tempo di dire diverse cose*, "that he has not the power of saying several things at one and the same time"; but it must be the aim of Art to waken that Harmony of many tones which lies slumbering in the human soul, and that must take place with lightning rapidity, like an inspiration of the Deity: for *armonia non s'ingenera se non in istanti, nei quali le proportionalità degli ogetti si fan vedere o'udire*. "Harmony cannot be bred otherwise than in instants in which the relative proportions of things are seen or heard." Here, obviously, it is the plastic artist who is master, for he alone reveals his whole work in one single moment, and that is why Leonardo speaks of his art as a Divinity, *una Deità*. But the musician too gives in every moment a multiform perfect Harmony, while on the contrary the word-poet is forced to build up bit by bit, *l'una parte nasce dall' altra successivamente, e non nasce la succedente, se l'antecedente non muore*, "one part is born from the other in succession, and the following part is not born unless the previous part is dead." It is not my intention here to discuss the æsthetic doctrines of Leonardo: I

have only felt compelled to show you with what a passionate bias this clear-sighted man paid respect to the Eye, and, beside the Eye, to the direct impressions of the senses in general as opposed to all mere reflection. The point of contact with Richard Wagner is clear, and in any other connection would give occasion to useful considerations.

Here, however, we have one immediate and special interest—Leonardo, the man whose Eye at once reminded us of Goethe's Eye, is not only the antipodes of Goethe in respect to the scientific observation of Nature, but he comes very near to refusing altogether to recognise as true art that very art in which Goethe rendered immortal services. From the point of view which we are for the moment adopting, Goethe and Leonardo stand so far apart that we should hardly bring them into relationship, were it not for Kant who holds out the hand to both. For as a matter of fact, Kant, whom a while ago we found to be of so near kin to Leonardo that the two viewed from the distant Goethe appeared like brothers, now, seen from point of view of Leonardo's æsthetics, seems to move close up to Goethe. In this method of constructing "parcel-wise"—*una parte nasce dall' altra*—we were able to discover a characteristic of Kant's method of perception ; now it is Leonardo who shows us, that it is equally characteristic of every professor of the art of thinking, even of the Poet—and instinctively these words, *una parte nasce dall' altra*, call to our recollection Goethe's Doctrine of Metamorphosis. Of course Goethe examines nature with an Eye differing from that of Kant, yet he too is forced to construct, and in order to put the phenomena of nature perspicuously into form and to embody them in his memory, he cannot help allowing one part to arise from another. That is the exact purport of Metamorphosis. Practically there is, then, in Goethe's intellectual personality, exactly as in

Kant's, a preponderant quality that we might well indicate with Kant as "understanding" in contradistinction to "Sense," or perhaps still better as Reason (in the Kantian sense of "the whole higher power of recognition,") in contradistinction to the power of observation. In both these men, Goethe and Kant,—however various may have been the sources at which they drew their impressions,—the insistence upon the idea of dallying with theory forms a common feature. However different from the path trodden by Kant may be that by which Goethe reached his Ideas,—he is only quite at home, only quite the master, quite the creator, in that domain which Kant calls the Higher Power as opposed to a Lower Power; while Leonardo looks upon this so-called Lower Power as the Higher Power, and takes no account of any knowledge that has not, "born of the experience of the senses, made its way through mathematical exposition, and found its final conclusion in experiment." That is why he exhorts us to put no faith in authors who have wished by the force of imagination alone to make themselves interpreters between nature and man: *non vi fidate degli autori che anno solo colla imaginatione voluto farsi interprete fra la natura all' uomo*, and warns us not to give ourselves up to those things of which the human mind is incapable and which cannot be demonstrated by any natural example: *Quelle cose di che la mente umana non e capace e non si possono dimostrare per nessuno esempio naturale*. As you see, Leonardo will only accept in relation to Nature the most strict empiricism knitting together effect and cause, whereas formation by Ideas as practised by Goethe, and defended by Kant, seemed to him to be idle imagination, or as he also called it *bugiarda scientia*, a science of lies.

Here then we discover how far-reaching is the difference between Goethe and Leonardo; for it is not merely con-

cerned with art alone, but extends to the whole method of contemplating nature. In the previous lecture we saw that Goethe was working with ideas when he believed himself to be in possession of experiences : that at once gives you an example of the dominant power of Reason —of the Higher Power of Recognition in contradistinction to empirical contemplation. For, as we saw in our investigation of the doctrine of metamorphosis, Ideas are certainly something seen, but not empirically seen ; in other words, they are not given to us by mere experience. It is true that they are rooted in Impressions of the senses, though that is only the field which gives them nourishment : the air which surrounds them is that of Reason, and the daylight in which we see them, radiates from within out of a *focus imaginarius*.

There is a saying of Kant's which will render us good service at this moment : for it describes exactly what it is that divides Goethe and Leonardo, and at the same time affords us a deep insight into Kant's own method of seeing ; by abstract study we might perhaps have failed altogether in understanding his view ; but in the light and shade of Leonardo's and Goethe's methods, his view stands out in plastic form. Kant is speaking of the essential nature of the Poet. After having, in diametrical opposition to Leonardo, assigned the highest of all artistic rank to the art of Poetry, he gives the poet the credit of encouraging " a free, personal and independent Power, untrammelled and unhampered, of observing and judging Nature as phenomenon, according to views which She herself affords neither to the senses nor to the understanding, and therefore to make use of her in the interests, and for the Schematisation of that which is transcendental " (i.e. beyond the senses). The poet, then, teaches us to look upon Nature from points of view which direct experience does not offer us, and opens up in us a power to make use of what is clear to our Senses for the benefit

of the schematisation of that which transcends them. This definition of the poet gives us an exact idea of Goethe's position in regard to Nature. In his method of observation there is a continual exchange between that with which the senses furnish us and that in which the experience of the senses only acts as a spring-board. Goethe is a good, trusty and, where necessary, a sober observer of Nature ; in spite of which it is in the noblest sense of the word a poetical longing—I must add a yearning and a formative power—which impels him to observation : he wishes to put in practice that “ free, personal and independent power,” and unconsciously he flies far beyond the boundaries of empirical experience. His *Orphische Urworte* with its last line :

Ein Flügelschlag ! Und hinter uns Äonen !

“ One stroke of the wings ! And behind us æons ! ” appeared first in the *Morphologie* of which the masterly *Athroisimos* belongs to the osteology, and here in the midst of illustrations of bones and comparative tables he cries out :

*Nimm vom Munde der Muse,
Dass du schauest, nicht schwärmst, die liebliche volle Gewissheit.*

“ Take from the mouth of the muse the sweet full certainty that thou art seeing and under no delusion.” So it is the Muse that is to be our guardian goddess in the domain of the investigation of nature. Goethe, indeed, in certain moments is fully conscious of his own method of procedure ; for in his legacy of notes upon natural science we find the following most noteworthy passage : “ Phantasy is far nearer to nature than the senses : the latter are in nature, the former hovers over her. Phantasy can hold its own with nature, the senses are mastered by her.” There you see at work the free, personal power, of which Kant spoke ; at the same time you see the exact opposite of Leonardo's convictions and principles. For

according to Leonardo all forms of knowledge are vain and full of errors,—*vane e piene di errori*,—unless they be created from the experience of the senses and tested by scientific experiment. Leonardo is such a strict empiric, that he goes so far as to warn the artist that he must know no other aim than to *gareggiare colla natura*,—literally “to compete with nature.” How differently the Eyes of Goethe and Leonardo work we see not only in the Doctrines to which their method of Seeing gives occasion, but also in the success of their activity. Not only can Leonardo say of himself, “in painting I can stand comparison with any other man, be he who he may,”¹³ while Goethe, after toiling for years, is obliged to confess the contrary, but Leonardo’s contributions to science are throughout of a different nature from those of Goethe. I am far from underrating Goethe’s doctrine of metamorphosis,—his doctrine of colour,—his other scientific thoughts; rather am I deeply convinced that his whole method of observing Nature possesses for the culture of the human intellect a significance of which we are only just beginning to be aware. In many respects Goethe is even now hardly born. But this significance is one of culture and not of true science in the strict sense of the word. Goethe will teach us “to cast a free Eye upon the wide field of nature”—a free Eye, that is to say the Eye of the conscious human creator, who no longer stands in dull obedience at the command of idle Matter, but who is able “to hold his own with Nature”: and that means at the same time the eye of the man who is no longer dazzled by his own compelling hallucinations, but who, thanks to Kant’s efforts, has won together with his own freedom, the freedom of Nature. All this,—to which I propose to return to-day, so soon as our observations shall have ripened sufficiently,—we can perceive, and yet must admit that it was Goethe’s part to excite and spur on exact natural science rather than really to

further it himself : while Leonardo, on the contrary, who saw as a schematiser, and thought as a mechanician, was such a master of the art of gaining knowledge, that in his guesses he anticipated the triumphant course of our natural history. As Kant proclaimed to us, "experience alone is the fountain of truth in the observation of Nature." Leonardo knew that full well: *gareggiare colla natura*, "to compete with nature"—that was his maxim not only in art, but also in science; it was his delight and the cause of his success. That the earth revolves is no symbolical idea, like Goethe's doctrine of metamorphosis, but a concrete theory; that the blood is chased from the heart through the veins, is not, like the discovery of the intermaxillary bone, an inference from an *a priori* admission, but a fact discovered by painstaking autopsy and observation. In respect of pure natural science, I think we may say that Leonardo surpassed Goethe almost as much as he did in painting. He knows the only true method: one sees that in him at once: and that says everything. Observation, experiment, mathematical calculation,—these are the three principles which he again and again impresses as the foundation of all knowledge. If beyond this we remember that he devoted a passionate interest to the technics of instruments (he built himself a sort of telescope for the observation of the moon a century before Galilei), we must admit that he possessed all the qualities which go to make the born investigator of Nature.

By working up with more and more sharpness the contrast between Leonardo and Goethe, we have now reached the critical point, that is to say the point where we shall be rewarded if we sink a deep shaft, confident of coming upon a vein of the precious metal of discernment. Whoso thoroughly understands the difference between the value for science set upon mathematics by Leonardo and that set by Goethe, has gained much, not only in the

estimate of the two great intellects, but for his own thought-life in general. At the same time this point is one of those which are of primary importance for the understanding of the intellect of Kant. For if a little while ago we saw Kant near—very near to Goethe—we see him quickly move back to Leonardo as soon as stress is laid not upon Art and Idea, but upon Science and Mathematics. Here it is not only the analogy of qualities between Leonardo and Kant which is dominant,—as it was just now in the case of the observation of schematising,—but a true close kinship in the whole manner of looking upon the universe. There, at a great distance, Goethe stands aloof.

I have already spoken of Leonardo's love for mathematics; but I must still claim your patience for a few moments. *Non mi legga chi non è matematico*, "let no man read me who is not a mathematician"! Such forcible language as this should be enough! but we have still got to learn that in Leonardo this is no question of a mere predilection, nor even of an instrument indispensable to the practical artist, but the insight of a philosopher into the essence of the human intellect. "The man who undervalues mathematics nourishes himself upon confusion," says Leonardo, *chi biasima la somma certezza della matematica, si pasce di confusione e mai potrà silenzio alle contraddizioni delle sofistiche scienze, colle quali s'inpara uno eterno gridore*. "For truth and the power of knowledge are contained in the mathematical sciences." That is a very important saying, "the power of knowledge." Goethe would not have subscribed to it: Kant would have done so with both hands. And because practical knowledge is joined to the mathematical way of thinking, therefore Leonardo lays down the dogma that "no human investigation can lay claim to be considered as true science unless it will stand the test of mathematical demonstration." For the criterion of

true science—*vera scientia*—is incontrovertible certainty, and knowledge in the sense of certainty is only afforded by mathematics. The consequence of this is that *nessuna certezza e, dove non si puo applicare una delle scienze matematiche over che non sono unite con esse matematiche*,—therefore no investigation can lay the foundation of true science, unless it can and does follow the path of mathematical exposition, that is Leonardo's impregnable conviction. It is with the clear recognition of the relationship between mathematics and knowledge that this miracle of a man forestalled Kant, in the same way that in his discoveries he anticipated Copernicus and Harvey. In one of his ripest works, *Die Anfangsgründe der Naturwissenschaft*, Kant writes in the same way, "I maintain that in every special nature-doctrine there will be found only so much exact science as it contains of mathematics." Certainly Kant, the thinker, analysed more exactly than Leonardo. The whole tenour of Kant's general philosophy teaches us to distinguish between "exact" and "inexact" science; he has shown us that a science which rests upon empirical observation alone, is only worthy of the name and dignity of a "science," so far as it does not deviate from experience, ordering its discovered facts systematically, and dissecting them in accordance with the relationship between cause and effect; but that such science should preferably be called systematic art (giving as an example the chemistry of his time), because the apodictic certainty of any true knowledge needs something more than empirical experience. This Something, which Kant calls the "Pure Part," is exactly that inner, human code of laws, which, in so far as it touches intuitive vision, is called mathematics. Nothing, with the single exception of mathematics, gives apodictic certainty, and apodictic certainty alone can be called knowledge in the strict sense of the word. Therefore, the more

we have of mathematics, the more we have of exact Science.

You see what a true and deep-reaching kinship exists between the methods of observation of these two men, who at first sight seemed so diametrically opposed to one another. Kant, absolutely devoid of all artistic gifts, has yet the power of recognising the fundamental significance of form and measurement in the building up of human knowledge; and in many of his works, and more especially in *Die Metaphysischen Anfangsgründe der Naturwissenschaft*, proves himself to be a genius of the first quality in the despotic domain of this schematic manner of Seeing; Leonardo, the artist, the painter of the Last Supper and the Mona Lisa, is none the less devoted to mathematics and mechanics; he compares the influence upon the intellect of their incontrovertible certainty, with that of light upon the Eye, and with the exaggeration of the hot-blooded artistic temperament, he utters the opinion that here alone lies the certainty of knowledge.

We have to deal here with a true harmony between the dispositions of the two men. And as a matter of fact this harmony reveals itself exactly where Goethe misses fire—for we may legitimately here speak of a miss-fire as well in art as in philosophy. So far as art is concerned we may well overlook the position, inasmuch as Goethe himself bitterly felt his own failure. But in the matter of philosophy he was not so clearly conscious, and that is what has led us and him to a condition in which the *pascersi di confusione* has gained great force. That Goethe despised mathematics is of course the foolish twaddle of the titmice that chirp on every twig of life; a single sentence of his suffices to refute it: "no one can set a higher value on mathematics than I do, for mathematics afford precisely that which it has been denied to me to accomplish."¹⁴ So he too felt that here something had

been "denied to him," and how highly he often valued this "something denied" is shown by a sentence in the *Farbenlehre*, the Doctrine of Colour, a passage where any irritation against the mathematicians might have been excused, and where in spite of that Goethe declares mathematics to be "one of the noblest organs of mankind." Still we must admit that Goethe was not only deficient in the power of practising mathematics, but was even unable fully to appreciate the essence of the science in its inevitable influence upon the human intellect. "It is a mistake to imagine," he exclaims pettishly, "that when I have discovered the mathematical equation for a phenomenon I know all about it that is worth knowing, and can consider the whole matter as sufficiently dealt with and to be laid on the shelf."¹⁵ What does he mean? The function of mathematics is to apprehend, to prove according to the laws of motion, to reduce clearly to a science—just as Albrecht Dürer did for the outer form of the human body, and as Leonardo tried to do for the mechanism of the circulation of the blood in its inner parts. "The book of Nature is written in the language of mathematics," says Galilei. Goethe, on the other hand, finds a contradiction between the phenomenon observed and the mathematical scheme. For this sentiment he has to thank the pure power of his sight; but instead of allowing himself to be taught by Kant that if Image and Scheme do not exactly tally, it is due to the essential quality of the human intellect;¹⁶ instead of recognising with Leonardo the fact that mathematical representation is the necessary organ of everything which can be called Science in the sense of exact knowledge, and that what he, Goethe, is striving after is not Science but something different, that is to say a glorified Contemplation,—that World of the Eye of which we spoke in the previous lecture,—and that this World demands ideal exposition; instead of all this, Goethe obstinately

works himself up into the unfortunate idea that there can be an unmathematical science,—that the employment of mathematics must be kept within bounds, and that they must be relegated to a narrow domain in the Study of Nature, etc. Science and art,—so he maintains,—have “fallen into pitiable error through the wrongful employment of mathematics.”¹⁷ When we remember that Goethe’s unmathematical dicta, of which we could cite many, are chiefly in the department of optics, and when we consider what a famous advance mathematical optics have made since Goethe’s time, and what a wide outlook upon comprehensive knowledge has been opened up in this very direction in our days by the work of Maxwell and Hertz; when we realise the present importance of spectral analysis to astronomy, chemistry, and physics; and then when we see Goethe ridiculing the spectrum as little more than a mere puerility of Newton’s, we must feel that however much the great observer of nature and Poet may have the right to view Nature in his own fashion, he is yet lacking in the understanding of the mathematical method of exact science. And this is the more striking when we find in Leonardo, two hundred years before Newton, a few but astonishingly correct remarks about the colours of the spectrum, and when we think of Kant’s high estimate of the undulation theory of Huyghens, we have then the experimental proof that if we follow Goethe in the path of science, we advance no further in the exact sciences, whereas by following the mathematical path, which he detested and which Kant looked upon as the only right way, we have advanced from one theoretical and practical attainment to another.

What, then, is the essence of the mathematical method? That is a question which it is impossible for us here to shirk, otherwise we should neither understand correctly Leonardo’s extreme way of viewing Nature, nor Goethe’s,

nor should we understand why Kant's philosophical critique enables him to do justice to both these antagonistic views. I shall try to answer the question at once in as few and as simple words as possible, leaning indeed upon Kant, but without making him responsible for my free and illustrative exposition; we shall deal more precisely with the matter in observations to be added hereafter.

So soon as we thoughtfully,—I use the word “thoughtful” in contradistinction to passive contemplation,—so soon as we thoughtfully approach Nature and construct that “unity of objects” without which she would no longer be Nature but Chaos, every single conjunction, arrange it as we may, means Motion. Think only of the commonest perceptions of any Bodies that you please, which you, innocent of any attempt at philosophising, simply join together, thinking in contemplative consciousness, something in the same way as the herdsman watches his grazing herd. Either the objects are at rest, and then our mind must move in order to perceive them, whereby we arrive at Form, or our mind is at rest and the objects move before it and then we arrive at Number: in most cases the two sorts of conjunction will take place simultaneously; and as you see, whether we direct our observation to the proximity in space, or to the sequence in Time, Motion is always at the bottom of it. Motion, says Kant, is that which unites space and time, and motion conceived, that is to say grasped by Reason, is Mathematics. If we look at the still geometrical figures in our school-books, we sometimes think that here is the very emblem of rest; but in the next lecture we shall see how the great Descartes laid the foundation of the higher mathematics, when he taught us to set free into Motion every resting Form, whereby we attain a second gift, namely, the power to convert every species of Motion into a visible, permanent Form.

I.—K

But just in the same way as these higher mathematics proceed from the union of Geometry and Arithmetic, so it is only by further, and, as closer observation shows, powerful conjunctions of space and time, that a really intelligible and logical Nature comes into existence for us, and it is from these conjunctions that we realise the ideas of the inter-relationship of various perceptions,—of the interchangeability of phenomena,—of causative cohesion. Thus, for example, the relationship between cause and effect signifies a twofold Motion in space and time. You will find that set forth with unsurpassable lucidity in the fourth paragraph of Schopenhauer's principal work, to which I refer you.¹⁸ And with further investigation and thought you will understand how Kant arrives at the definition, "Matter is that which is movable," and at the assertion that space can only be filled by motion. And that you may not think that I am leading you on to the pin-points of the most abstract philosophy, but that, on the contrary, you may understand that I am dealing here with the concrete and necessary apprehension of Nature by human intelligence, I will call your attention to the fact that our modern physics, however antimetaphysical may be their attitude in their empirical delusion, learn to recognise Kant's standpoint as the only justifiable one, and that the little globules of atoms are only preserved as a deduction and a help for coarser intellects, whereas Lord Kelvin and other leading spirits among the mathematical physicists speak of "centres of energy," and by atoms understand gyrating motion. Lord Armstrong,* in his book *Electric Movements in Air and Water*, asserts that there is no ground for looking upon Matter as anything else but Motion. Even the hypothetical æther he rejects as super-

* I purposely cite English investigators because no others, not even Italians and Frenchmen, are so far removed from the influence of German metaphysics.

fluous, and is of opinion that "empty space would do just as well, if we only chose to conceive a continuity of interacting motions."¹⁹

I think that this sketch, slight as it is, will suffice to make you understand and accept Kant's apodictic assertion, "natural science is throughout a doctrine of Motion, either pure or applied."

But here comes in a second important consideration, not, like the first one, composed of physical elements, but purely philosophical. The highest code of this science of Motion is not perceived as a fact in Nature, but is rooted in the essence of Reason. It is we ourselves, we men, who have no other possibility of comprehending Matter, that is to say, when we aim at a comprehension of Nature which shall be logical, thoughtful, and capable of founding an apodictic certainty of knowledge;—it is we ourselves, I say, who are unable to comprehend Matter otherwise than as Motion, and for whom in consequence of this every *vera scientia*, every absolute certainty is bound to result in a doctrine of motion either pure or applied. The human understanding works out the analysis of Motion by its special gift of schematic experience which we call mathematics. It is by mathematics that the human intellect assimilates and digests that which is foreign to it and outside of its ken. Much is rejected, but what remains from that time forth becomes possessed of a humanly comprehensible form. That is what Kant means when he says, "the highest law of Nature must lie in ourselves, that is to say in our understanding." To put it rather roughly, but in a way suited to the present standpoint of our study, Nature gives the facts, the human understanding gives the laws. To formulate this let me once more bring forward words of Kant's, "the human understanding does not create its laws out of Nature, but imposes them upon her." At the first blush this remark will perhaps strike you as

strongly paradoxical, but it will suffice for the present if you to a certain extent clearly grasp these two things : all exact Science, in the true and strict meaning of the word, resolves itself into a Doctrine of Motion. All Doctrine of Motion is mathematics, and so far human. To try to escape from a law of our true Being is nothing less than an attempt to creep out of our own skin. We may well therefore praise the acuteness of the great Leonardo, who had so rightly and energetically grasped the fundamental law of all exact investigation—in opposition to whom when a man comes forward, even should he be a Goethe, and exclaims, Friends ! I will teach you a Science that shall be unmathematical,—then we recognise and acknowledge the fact that the great man is entangled in deep error. Indeed, the error is two-fold, first inasmuch as his definition of Science cannot be called adequate, and secondly because he does not rightly grasp the essence of mathematics, and their law-giving function in reference to all that constitutes causal conjunction, and that means Nature as it exists in our thoughts.

Quite another question is whether that which Goethe strove after, that is to say an unmathematical, and to that extent un-logical and therefore unscientific comprehension of Nature, is not, say what you will, entitled to a profound measure of justification. Here, too, is a question that we must not leave unanswered, for it is of weighty importance in the understanding of Kant. But in order to answer that question we must do as we did in our former lecture ; we must undertake an excursus which will furnish us with the indispensable and self-evident material. If you were minded without any further preparation to plunge headlong into Kant's abstract-analytical method of thought, I suspect that it would be very difficult for you to bring a vivid understanding to bear upon his exegesis of an unmathematical

conception of Nature, what he calls "Nature as exposition"—whereas starting from Goethe you are at once in a position to understand Kant, and so will be able to delight in the unexampled profundity of the most powerful of all thinkers. We must then take heart and undertake an examination of the relationship between exact Mathematical Science, to which alone Leonardo assigned any value, and Goethe's comprehension of Nature. In the main this excursus will result in a comparison of physical optics and Goethe's doctrine of colour ; there are, however, some general remarks with which we have to set out, and which will weave themselves into our exposition as it progresses.

* * * * *

The difficulty which at the outset attaches to our task is the fact that Goethe himself was devoid of any theoretical consciousness of his own procedure, one might even say of his own aim. His own saying, "a man has never gained so much ground as when he does not know whither the way leads," is true of himself ; for while he believed that he was doing no more than lending a hand in contemporary investigations of nature, he was in reality founding a new method. That is the naked truth, the unrecognised truth which seems to have foundered without leaving a trace, yet not for ever, in the noise and dust of the vulgar riot of our successful mechanical science. There are moments in the activities of great intellects where they render superlative services : that is when they do not quite understand themselves, when they enter the lists to do battle passionately for some impossible assertion, in spite of being gifted with a keener sight than their fellows, and with more consequential thought than their censors : for it is just here where they entangle themselves in a mass of contradictions, that they work like an unconscious natural force, paving

the way for future knowledge : here the intellect collects itself into an avalanche ready to sweep clean all the tidy paths of human frivolity, or like a volcano bursts the too heavily weighted crust in which the idleness of tens of centuries has imprisoned the bright fiery element of the soul of man. Only consider Goethe, that noble man ! Is it thinkable that he with his brilliant eyes should have looked in the light during a whole lifetime, and have seen nothing true ? Yet, as I know that here I shall at once be tilting against unbelief and contradiction, I will quote the words of a pioneer in exact natural science, the admittedly greatest physiologist of the nineteenth century, Johannes Müller. He was what Louis Agassiz, Clerk Maxwell, and Heinrich Hertz (but with their exceptions a dwindling number of our famous natural investigators) were, a really lofty intellect of permanent importance. Here is what Müller says with reference to Goethe's essay on the skeletons of rodents,—“ It is impossible to point to anything similar which comes up to this projection sketched from the centre of the organisation. Unless I am mistaken there lies in this outline the foreshadowing of a distant ideal of natural history.” Remember these words “ the foreshadowing of a distant ideal ” ! And Müller, the exact investigator of nature, prizes the awakening of this foreshadowing so highly, that on the next page he pronounces the judgment, that Goethe has “ reached the greatest ” not only as artist, but also as investigator.²⁰ Here, too, is a judgment which should never be forgotten. For we moderns have grown up under the nourishing showers of pseudo-scientific platitudes ; Rudolf Virchow alone dared forty years ago to take Goethe as investigator publicly under his protection, a weighty witness indeed, upon whose exactitude and unimaginativeness no man will cast a doubt, but who unfortunately was not competent altogether to lift the veil of misunderstanding : for to that end would

have been required that philosophical training which Virchow abominated, so that his fine words raised a great storm of dust at the time, but soon died away leaving no influence behind them.²¹

In these days every tiny two-legged wheel in the great machine of science thinks himself justified in shrugging his shoulders over Goethe as an investigator of Nature. I happen to possess an autograph letter from one of these celebrities, who rates his professorial dignity at a height which entitles him to allow himself the following judgment of Goethe: "his conception of Nature is just what an easy-going æsthete and collector of curiosities might make up out of his walks abroad." This is the audacity of a man of middling capacity whom the schoolmaster's rod and the sting of hunger have raised by luck to the degree of Doctor of Philosophy, and finally up the three steps of the Professorial Chair! A man whose fame may perhaps live through two or three editions of our encyclopædias, dares to speak in this way of the princely intellect of a Goethe, of that god-like Eye which for more than half a century never ceased in the thoughtful contemplation of Nature, of a man of whom a Johannes Müller could pronounce the opinion that as an investigator he "reached the greatest."

But enough of this. If I were to talk myself into a state of indignation over the intellectual decay resulting from the narrow empiricism of a tyrannical science which has fallen a prey to the overlearned Philistines, I should not readily come to an end. The reaction has already begun; there are good men and true of a younger generation at work on behalf of Goethe the investigator, and what is more important than the influence of these individuals is the fact that a universal necessity, a cultural need that cannot be put aside, is forcing us to enter upon the road which Goethe has pointed out to us as the "foreshadowing of a distant ideal," unless we

wish to fall into crass barbarism. A leading spirit among the living antimetaphysical empirics, Ernst Mach, has disclosed what is the next thing to be annihilated, and if his object was to serve the ends of a purely mechanical barbarism he has not been far out: our languages! In the interest of "science" they are to be abolished in order to make room for an abstract international language!²² The ideal which floats before the learned professor is the Chinese system of writing, because, being entirely ideographic, it throws overboard all ballast of expression of the finer emotions.²³ After that grammar and history are to be "laid aside." Add to this the simplification of the Alphabet, and supplement it with algebraical formulæ and chemical symbols, and you will have collected together all that Professor Mach deems essential in a language. He is not far out. A science which only concerns itself with abstract Ghosts, is at no single point in contact with life. Goethe's desire, by means of his doctrine of colour, parenthetically "to enrich language and so facilitate the communication of the higher conceptions among the friends of Nature," from this point of view must signify the *ne plus ultra* of folly. And when Mach, in conclusion, expresses the hopeful opinion that the English language is in a fair way to reach that ideal, we will not ignore the tiny grain of truth which has crept into this Hellish dream, worthy of one of Breughel's Witches'-sabbaths, and join the standard of those who hold no inheritance more sacred than that of their mother-tongue. The richer, the more illogical, the more incomprehensible a language, the better does it hold up the mirror to Nature. The men who have attempted to rob us of our language, have, so far as in them lay, robbed us of Nature; has not Lord Armstrong taught us that science needs no more than the assumption of empty space (*vide supra*)? In contradistinction to which the man whose genius was rooted

in the sovereign and creative mastery of language,—in his much-despised teaching of nature followed the one object, to give us side by side with his immortal poems that which was their one eternal Source, visible, inexhaustible Nature with all the wealth of its many forms.

Goethe, as I said before, did not possess a critically analytical consciousness of his new method, and hence it is that his judgment as to the relationship between his way of investigation and that of true science, is hazy and easily misleading.

Sometimes his insight is clear enough, for example when he cites the attraction which in his youthful days Spinoza exercised over him, and adds, "the mathematical method was the very opposite of my poetical method of thought and exposition." This, of course, is a general statement; the mathematical method, dear to the Jewish Thinker, seems to Goethe to be in opposition to his own poetical method of thought. And yet when we come to deal with the special investigation of Nature there are passages of decisive import which may be brought into court. I select one from the year 1826, which possesses the importance of a composition with mathematics. Goethe writes, "It was not long before I was compelled, in deference to my own capabilities and relations, to claim the right to view, to investigate, and to comprehend Nature in her simplest, most secret beginnings as in her highest and most striking creations without the co-operation of mathematics. That has been my contention through life. Any service that I may have rendered in that way is open to all: how it may appeal to others remains to be seen."³⁴ Is not this perfectly clear? "In deference to my own capabilities"—that points to the capabilities which are "in opposition to" Mathematics. And Goethe claims the right to view, to investigate, and to comprehend Nature in accordance with these capabilities. To view, to investigate, to com-

prehend, that is a perfect programme for a personal system of Natural Philosophy. Further on in the same disquisition Goethe says in so many words that "a new point of view justifies new opinions." This recognition explains the many passages in which Goethe declares, with no trace of bitterness, that his method of contemplating Nature "is incomprehensible to the Professors, for the simple reason that they think otherwise"; it is in these passages that he confesses in regard to the first great congresses of German works on natural history, that they furnished nothing which could in the slightest degree touch, or move, or excite him, no new encouragement, no new gift,—and this was the man who "for fifty years had been passionately devoted to the observation of nature"; for among the German natural scientists there was "not one that showed so much as the slightest approach to his own way of thinking."²⁵ And there are other passages which come under this category, in which Goethe in his last years,—as, for example, in the essay on the rodents quoted above—instead of as was his wont portraying his efforts in the domain of morphology in the bright colours of the successful investigators, all at once "feels most vividly that his honest endeavours in the observation of nature, were only presentiments and not pioneering." All this leaves nothing to be wished for in the way of clearness and true insight. In such moments Goethe is so fully conscious that he cannot see eye to eye with the men of true science, that he claims it as a right to dare to investigate in his own way, and admits that this way is something which continues to be incomprehensible to them, indeed that he is dealing with a "new standpoint,"—with something in the future,—of which the significance remains half veiled even to himself.

Physics simply do not recognise the fundamental ideas of Goethe's Doctrine of Colour. So from the stand-

point of physics it is impossible to judge of this theory. Goethe starts precisely at the point where Physics leave off. It is evidence of a quite superficial appreciation of the matter when people go on talking of Goethe's relation to Newton and modern Physics, and at the same time take no thought of the fact, that these two are entirely different.²⁶

Unfortunately it is Goethe himself who with the utmost impressiveness and vehemence has spoken about his so-called relations to Newton, and not to Newton alone, but to exact natural science in general. Did you remark in the above-quoted solemn declaration the five simple words, "without the co-operation of mathematics"? That is where the evil fountain of misunderstanding still continues to flow. It is not without the co-operation of mathematics, but in opposition to mathematics that Goethe observes, investigates, and comprehends Nature. The mathematical method and Goethe's method may run parallel to one another, but can never coalesce: no compromise between them is possible: they cannot at one time work together and at another time without one another.

One instance will serve better than a hundred to show you how deeply this misunderstanding penetrated in Goethe's case. One month after that fundamental declaration in which the practised eye alone can detect the blemish of the "without co-operation," he says to Eckermann: "surely it is not the mathematicians who invented the metamorphosis of plants? I worked it out without mathematics, and the mathematicians have been forced to admit it." If these words are correctly reported, they are valid proof that we must trust to our own powers in order to see clearly in this matter; Goethe, the herald and founder, leaves us in the lurch as to the true understanding of his work. Mathematics and metamorphosis! This would have been the place to show that we are

dealing with two dissimilar and irreconcilable subjects which nowhere come into contact with one another. The first lecture has shown you what was Goethe's idea of metamorphosis ; we must admit that, like every human acceptance, it implies the conception of Motion ; but instead of trusting itself like the sailor to the stream, it hovers like an eagle in the empyrean from which the living hurrying flood is at once Motion and Rest : Motion, so far as its law of existence is concerned, Rest as regards form. Mathematics (and in a wider sense all true science, inasmuch as it everywhere obeys the one impulse to be converted into mathematics) have no other power and function than the analysis of the condition of Becoming ;* even that which is at rest they must set free into motion, otherwise they have no hold upon it. Goethe's efforts, on the contrary, do not tend towards analytical knowledge, but towards the most intensive contemplation,—“ the world of the eye,” the law of which is not Becoming, but Being. That accounts for the peculiar permeation of that which is simultaneous and that which is successive which has sometimes puzzled us, as indeed it puzzled Goethe himself. For while science, whose whole essence depends upon the understanding of cause and effect, recognises Being as an almost imaginary point between something which has been growing and something which is yet to be, the Eye, on the other hand, although not blind to successive alterations, can manifestly never perceive the condition of progression or process of “ Becoming,” otherwise than as locked up in a condition of Being. This will suffice for the moment to show the absurdity of Goethe's outcry against the mathematicians. How was any mathematician, as such, to discover Meta-

* There is, so far as I can see, no single English word in common use which accurately conveys the meaning of the German *Werden* as opposed to *Sein*. *Werden* is the process of Coming into Being—i.e. a transition state ; *Sein* is Being—i.e. an accomplished fact. I shall translate *Werden* throughout the book as “ Becoming,” or “ coming into being.”—R.

morphosis? He would have been a poor mathematician. Nor do the words, "I discovered this without mathematics," hit the nail on the head any better, though Goethe rarely fails us in that respect. And as regards the closing remark, "they have been forced to admit it," that is simply based upon error. Goethe's doctrine of metamorphosis has been as much repudiated by Science as were his anti-mathematical optics. It may be admitted that the repudiation was not so unanimous and immediate, but only because in the domain of Biology the complication is far greater, so that room is afforded for endless misunderstandings. But open any reliable contemporary book on botany, for instance, Julius Sachs' *History of Botany* (chapter 4), and you will find Goethe's doctrine of metamorphosis unconditionally refuted. Sachs shows how Goethe was continually wavering between fact and idea, and he reveals the mischief of which hangers-on laid the foundation during long years, while they, instead of turning to account the thought of metamorphosis "in the deeper sense of idealistic Philosophy," introduced it into exact science, which was impossible without "combining the highest abstractions with the most careless and rawest empiricism, and in a measure with quite false observations." The doctrine of metamorphosis has been quite as much a hindrance as a help to the science of the nineteenth century. That is the judgment of a scientist whose right to be heard cannot be called in question. You see how peculiarly connected it is with the words "they have been forced to admit it." But the great confusion which to this day has existed between Goethe's doctrine of metamorphosis and exact science, is due, as I said before, to the nature of the subject. All the sciences are striving towards mathematics; yet Biology, in contradistinction to Physics, is still far from having reached the mark. And here we must depend upon a schooling of the sense of sight, otherwise the subject will not be seen at

all. We may observe, but we shall not take notice. That was why before Goethe's time comparative anatomy dragged out a miserable existence; men like Kaspar Friedrich Wolff died unknown. Goethe, with several others around him like Camper and Oken, was the first powerfully to excite the imagination, and so compelled it to take notice of what was seen. Here alone lies the significance for science of a doctrine of metamorphosis. The whole of Goethe's natural science might be called "an introduction to the art of seeing." Nor is that a small thing to say; for phantastic imaginings do not teach the art of seeing, but on the contrary lead to those false observations which Sachs blamed; on the other hand, there is a Something which Goethe by a happy inspiration called the "exact phantasy of the senses."²⁷ This phantasy is—as the word describes it—something felt by the senses, not abstract; it rests upon very accurate Seeing, and the unsurpassable exactness of many of Goethe's observations is attested by Müller and Helmholtz, by Virchow and Gegenbaur, by Sachs and Ferdinand Cohn; here, however, exact Phantasy must be allied to exact Seeing. Scientific hypotheses all pass away, but Goethe's Doctrine of Metamorphosis and Doctrine of Colour will never pass away: they stand as firmly as the facts which they mirror in Reason. Hence the importance of Goethe's ideas in Zoology and Botany. Science has used his thoughts as she uses the ophthalmoscope, in order to see into the depths, to discover facts; but, only as tools, not as an organ. It is true that the Doctors of the theory of evolution delight in tracing their pedigree to Goethe, but that is the innocence of the elderly child that would do better to search for an ancestry in Moses, Sanchoniathon, Thales, and Empedocles; venerable men who historically would render it better service, and are also more in sympathy with its intellectual culture.

But in order exhaustively to lay bare the relationship

between Goethe's conception of Nature by means of the "Phantasy of the senses" and the mathematically exact Science of Nature, we must avail ourselves of a concrete example. For this Optics and the Doctrine of Colour must serve our purpose. Naturally it is not possible for me here to dive into the mysteries of optics, nor indeed would any man be able to give an exposition of Goethe's doctrine of colour with greater brevity than he did himself. That immortal work is all Perception and pure Perception; the least learned of men can study it paragraph by paragraph, and see step by step what Goethe saw. Here sight and understanding are identical. One would imagine that every man would lay hold upon it. And since Helmholtz, whom I may well quote here as the universally honoured representative of the mathematical anti-Goethe science, has expressly affirmed, "the experiments which Goethe cites in his *Doctrine of Colour* are accurately observed, and vividly described; as to their correctness there is no dispute,"²⁸ no one who might wish to read this forbidden book need tremble for his scientific salvation. Exact, correct observations, which have moreover earned the praise of a genuine university professor as being vividly described, can certainly harm no man. But I know that it is all of no use; no human being can be induced to read the *Doctrine of Colour*. This glorious child of a demi-god is like a sleeping Brünnhilde waiting for the dawn of the new day which shall bring the hero to awaken her. We can therefore only deal with a few leading principles: that however will suffice to enable you to grasp the difference between "Nature as Mathematics" and "Nature as Exposition," and never again to fall into doubt as to the right of the latter to assert its right to a place side by side with the former. In this connection Goethe, Leonardo, and Kant, each in his own special individuality, will arise before your eyes.

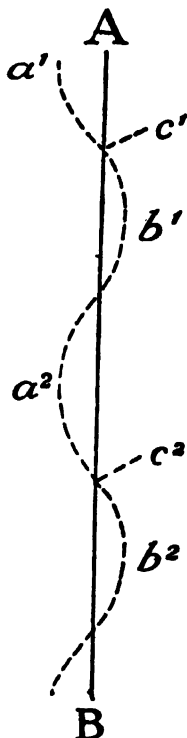
The first paragraph in Helmholtz's *Optics* consists of a definition of light, set forth as follows: "Light is looked upon by the majority of physicists as a peculiar form of motion of a hypothetical medium, the Light-æther; and we will accept this view of the undulation-theory which very fully accounts for all Phenomena." Here you have in a nutshell the whole method of mathematical-mechanical science. The storied words of the dying poet, "more light!" are often cited in and out of season. What would our sensitive souls have said if Goethe had called out "more special motive-form of the hypothetical medium!" Do not, however, believe that with this poor joke I wish to cast ridicule upon the optical definition; no less a man than René Descartes is responsible for the conception that light must be looked upon as Motion, and indeed as the motion of an invisible medium pervading the universe. It is the acceptance of this theory that has made optics the most perfect of all sciences: I only wished to call your attention to the fact that the first law of all science—if science is to be exact,—is the abolition of that which is visible, or if not in so many words of that which is visible, in any case the abolition of that which is practically seen, in favour of an abstract, mathematically available, altogether unfelt and schematic representation. In the same work (p. 268) Helmholtz actually reproaches Goethe with the fact that "in his studies in natural history he starts upon the principle of never abandoning the domain of that which is visible to the senses." From the point of view of science, then, it is a mistake to dwell upon that which is visible to the senses; for, as Helmholtz goes on to say, "Every physical exegesis must rise to the level of all those Forces which can naturally never be objects perceptible to the senses, but are only objects of the apprehensive understanding." These so-called Forces are purely creatures of the imagination: even the most sober anti-philosophical

Science now admits that they only exist in our heads : and for that very reason they are unable to make use of the perception of the senses as such, but have to replace them by a sensibility of the imagination.²⁹ What is then seen is, as one of the greatest men of genius among the physicists, Heinrich Hertz, admits, a delusion from which it is impossible to exact "any conformity with things."³⁰ The very first step then leads from concrete perception to the abstract, and until that has been attained no Science is exact. To the unlearned, to the men of simple thoughts, Light would seem to be the most concrete of all perceivable things. And yet here you have a definition of Light which thrusts aside all perception ; for looked at exactly it contains only two propositions, of which the one says "Light is Light-æther," an idea which reminds one of the "I am that I am" of Jehovah, and must be dealt with by the logicians ; while the second adds the assertion that "Light is motion." Now since the most cursory reflection has already sufficed to teach us that the conception of Nature as Motion is an irrefutable requisite of the human intellect,—that is to say that it is not a law of Nature but of our brain,—and inasmuch as Leonardo as a keen thinker even in his day recognised the justice of this principle,—it follows that the above definition is neither more nor less than an universal metaphysical postulate. Since then, as you know, certain leading Physicists have also declared against the hypothetical medium, the æther, as superfluous. In their minds Light is nothing but abstract motion in empty space.

But now let us, please, read a little further in Helmholtz. We come to the Scheme. As Kant acutely remarked, "The subjective principle of Nature precedes the objective, the *combination* precedes *that which is combined*." That "which is complex must be supplied by ourselves," for we can investigate "only that which we

have ourselves supplied." Now in optics we supply a great deal.²¹

Following the advice of Helmholtz, let us attempt to represent the "peculiar form of motion of the hypothetical medium" with the help of a wet thread which we shall hold in our fingers and allow to hang down freely, moving to and fro.



Here you see the diagram; the line from A to B is the thread when not in motion; so the tiny particles of Light-æther follow one another in a straight line so long as they are not in motion: and here the dotted line shows you how the so-called waves behave as soon as a particle of æther begins to rock backwards and forwards at the top point A. And what is the reason of the movements of this same particle? Here again we have something peculiar. Helmholtz writes, "exactly as the movement of the single particles of the thread takes place, so would be the movement of a succession of æther-particles along which a ray of light should transmit itself." If then we have above received a definition of Light containing nothing more than the abstract admission that Light is motion, the Light-ray is at once introduced as an hypostasis transmitting itself along the particles of

Light-æther, and so causing their motion. And whilst light is, according to the definition, a movement of waves, the Light-ray is, according to the mathematical definition, "a perpendicular line." Here we seem to have got into something like a witches' caldron! Let us just imagine that the sun is at noon: the world is steeped in light: how many rays are we to reckon there? Certainly more

than you would see in the halo of a Byzantine Madonna's head. Does this raise a smile? And yet here is no joke, but your faith is bespoken for the following proposition: "we can in such cases consider the movement of the particles of æther inside a ray approximately as an isolated mechanical Whole, progressing independently of the movements of the neighbouring rays." You perceive that the rays are an altogether material conception. The possibility that innumerable rays running side by side do not take up the lateral movements of the æther-particles, so that for the very superabundance of light-rays there is no light, is a question which you must settle for yourselves, for to that Physics afford no answer. If we had the wave-movement alone, or the rectilinear movement alone (which latter movement laid the foundation of the whole optics of Newton who knew nothing of any wave-movement), then in that case our power of conception would at least possess a possible illusion; but to our mathematical Physics both conceptions are indispensable: Light is a rectilinear movement which does not spread itself like sound in all directions, and in spite of that Light is at the same time a wave, or undulatory movement. It is only by the conjunction of these two contradictory hypotheses that all phenomena can be exhaustively and mathematically reduced to a Scheme. The great mathematician d'Alembert calls attention to the fact that the so-called "cloudlessness" of Mathematics really only holds good where they deal with the wholly Abstract, but that the richer the evidence of the senses to which you apply them, the darker become the conceptions upon which you base their operations.³² You see here how true are his words. Mathematical Physics are practical, useful, infallible, grand, bewildering—I would gladly grant their right to all the laudatory Predicates in the Dictionary,—with one exception, *clear*. Whoever in agreement with d'Alembert searches

into their foundations, will find them *obscure*. When Goethe wished to lay before a friend a few ideas concerning light he began by storming against the unhappy conception of the Rays. "There is absolutely no question of Rays,—they are an abstraction invented to explain the phenomenon in its greatest simplicity, an abstraction worked up, built upon, or rather piled up, until the whole matter at last became muddled into incomprehensibility." But let us leave the so-called Rays and return to our Waves, only following the exposition so far until we meet a practical conception clear to the senses, so as to justify the belief that we are floating down from the cloudy Olympus of hypothetical constructions, and are setting foot upon the solid ground of empirics.

And here I would crave your attention : the time has come for us, as Kant taught us, "to supply the synthesis." In proportion as I move the thread more or less violently, so the serpentine line which it forms in the air will show greater or lesser curves ; in the same way the æther-particles in the Light-æther, in proportion to the violence of their motion, will deviate more or less from their original position,—in other words, the Waves will be higher or lower : this variation in the height of the Waves is known as the *Amplitude* of Wave-motion. Besides the height of the Waves their length has to be taken into consideration. The distance between a^1 and a^2 , from wave-crest to wave-crest, or from b^1 to b^2 , from wave-valley to wave-valley, may vary in length : that is called the *Wave-length*. Thirdly, the movement of each æther-particle, which can be imagined as rocking to and fro, may take place with varying speed : that is called the *Duration of oscillation*. Pray hold fast to the conception that we must admit in these Waves a varying height, length, and duration of oscillation. And inasmuch as thought, as the saying goes, pays no duty, we may besides all this assume various directions of motion.

Once more let us consider the wet thread. I can move my hand from right to left and from left to right, and then the single particles of the string which is curving into waves will also move rectilinearly to and fro; the same holds good with the æther-particles; in this case we say that the light is "rectilinearly polarised." But just as I move my hand rectilinearly from left to right, I might equally move it in a right line to and fro from front to back; I must therefore assume at least two directions of oscillation, and indeed might, if necessary, assume as many more as I please; in the simplest case we speak of two perpendicular directions of waves mutually polarised. Again, I might move my hand in a circle or in an ellipse. In that case the single particle of the string would, instead of a straight line, describe a circular line, or an elliptic line from one wave-crest to another, or from one wave-valley to the next: here too we must assume the same of the Light-æther particles; in the one case we speak of circular polarised light, in the other of elliptic polarised light. There are several other complications, but for our present purpose this is sufficient. We can therefore conceive waves of varying amplitude (that is to say height), waves of different length, waves of different duration of oscillation, waves rectilinearly polarised, perpendicularly polarised in opposition, circularly polarised, and elliptically polarised. But now I have to make a last and highest demand upon your imagination. Represent to yourselves all these differences with all their various prepositions as before, "with," "in," "upon," etc.—high waves and low waves, short and long, swift and slow in their oscillations, in endless gradations, pressing upon one another in all directions,—and in addition the æther-particles in various straight lines, and also working through each other in circles and ellipses: and then do you know what you have arrived at? Why, the *Natural Light* of the Physicists, as the

sun, the candle, the match brings it into existence ! This again is a serious matter. Cross-examine Helmholtz : he will furnish you with information. " Natural light," he writes, " is a uniform compound of all sorts of differently polarised Light," moreover, " it contains wave-features of an endless number of continually intermingling values of oscillatory duration."

It seems to me that we have fairly carried out Kant's behests as to ourselves supplying the synthesis. Yet I must here insert a remark. Nothing would be more unjustifiable than to ridicule this Scheme of the physicists, far rather would I with complete confidence vote with Kant that such intellectual constructions are " the pride of human reason." It is only by degrees that the monstrous complexity of the illusion established itself, as new phenomena, which it was necessary to incorporate in the one great Scheme, gradually became known ; new ones have cropped up since Helmholtz's time : as for instance the Röntgen Rays, which compelled the conclusion that the oscillations do not only take place perpendicularly to the direction of transmission, but also parallel to it ; that is to say as if we were not only to move our wet thread to and fro rectilinearly and in a circular line, but also from top to bottom and conversely from bottom to top,—not only therefore in the direction of floor and ceiling, but also in the direction of the room's walls. There will always be new additional matter coming to the front, until in the end the Scheme of Undulation will become useless by reason of its growing and alarming complication, and then some genius will enrich us with a new Image which will combine Light, radiating energy, chemical agency, electricity, magnetism, in one single practical scheme paving the way for new discoveries. The new theory is already at hand, widely developed, only lacking as yet a presentation as Image.³³ Enthusiastic admiration is the due of those men who like

Democritus and Descartes and Kant endow the human brain with such schematic and creative illusions; and unquestionable recognition is the meed of those men of exact Science who, like Newton and Helmholtz, by their scorn of fatigue, their gift of observation, acuteness, power of sensitiveness, and talent, not only enrich the treasury of knowledge,—adding to the already existing thoughts of genius which they have inherited,—but also render to mankind services of imperishable value. One need only think of the ophthalmoscope! The depreciation of exact science, as we meet with it here and there in the works of various fanatics and obscurantists, makes one so indignant because it denies manifest demonstrable services which every lamp-cleaner can see even if he cannot understand them; whereas the depreciation of philosophy and art is pardonable where it is due to stupidity or faulty education. We must have no misunderstanding upon this point. The one thing against which I defend myself is this, that an invisible church served by a priesthood of narrow-minded, arrogant, and intolerant professors, who under the honourable title of “learned” enjoy a quite unjustified respect,—since learning and power of judgment by no means of necessity go hand in hand²⁴—that these enemies of nature, this tribe of fanatics should seize upon my understanding even in childhood, should annihilate its healthy power of observation, should hold in a scientific vice its healthy thought, and compel my belief in silly dogmas with a tyranny more cruel than the tribunal of the Inquisition. There is no need for me to believe in God: it matters little whether I am a morally strong, energetic, and free man: but if I refuse to believe in the hypothetical medium, the waves that are rays and the rays that are waves, in the amplitudes and oscillations and polarisations and such abominations, together with the descent of man from apes and of apes from jelly-fish, then I am outside

the pale. Heinrich Hertz gives a striking example with reference to our modern Physics. A piece of iron lies upon the table. Why does this iron not fly into the air, or pierce the table in order to fall to the ground, or burst asunder into millions of atoms? Just as in the case of Light, physics here set out such innumerable so-called "forces," all of them busily at work dragging the piece of iron hither and thither, that a mathematician would have to work for weeks before he could give a scientifically plausible proof that the piece of iron is really lying peacefully upon the table. Hertz writes, "But the truth is that all powers are so compensated as against one another, that the whole arsenal of them comes to nothing: that in spite of a thousand causes of motion which are present, no motion takes place: that the iron just remains quiet. If we lay these conceptions before unprejudiced thinkers, who will believe us? Whom shall we convince that we are talking of something real and not of the hallucinations of an extravagant imagination?"³⁵ We may accept the power of imagination of science even though it becomes extravagant; but that we should sacrifice our independence, our reason, our phantasy nourished at the fountain of perception, and lay it upon the altar of this Goddess of Abstraction,—that is something that we must fight against with might and main before it is too late, before this scientific barbarism shall have plunged us into the darkness of night.

But we had proposed to ourselves to follow the course of the exegesis of Physics until we should at last reach something real and tangible, and not a mere imaginary perception. And here on the very page where there is all this talk of waves and polarisations, a little lower down a well-known idea beams upon me. I see the word *Colour!* and what do I read? "the most striking peculiarity by which Light of varying oscillatory duration distinguishes itself is Colour."³⁶ The unprejudiced thinker to whom

Heinrich Hertz appealed will at first, as it seems to me, be staggered by this. Colour is oscillatory duration? Yet there is no mistake; for here is the definition: "when every æther-particle in the motion of light always, over and over again, follows the same course at the same time and at the same speed, then the Light is called simple, monochromatic, or homogeneous." The unprejudiced thinker is more and more puzzled. He remembers that to the Physicist Light and Visibility have absolutely no common signification; in every ray of Natural Light the Physicist detects a great quantity of "Unseen Light"—there is the ultra-violet and the infra-red (or ultra-red): it follows that every wave must have its colour, a colour which no human eye can see. What is colour outside of the circle of Red, Yellow, Green, Blue? What is an invisible Colour? Neither a perception nor a conception in any way possible. Besides this, Physics are compelled, as we have seen, to premise that there exists a boundless number of continually interchanging values of oscillatory duration: this claim, raised in a somewhat different form by Newton, who admitted an endless number of material light-corpuscles, cannot be denied by any one who is possessed of the elements of mathematical Physics; now the physicists reckon the number of oscillations in the deepest red at 400 billions in the second, and in the brightest violet at about 800 billions: according to the definition of the physicists, therefore, there must be within the visible spectrum some 400 billions of different colours. In truth, however, in theory as in practice, we can well do with the acceptance of four primitive colours, as Leonardo has shown in many passages; many people, Helmholtz among the number, have thought it sufficient to distinguish three colours.³⁷ Besides this there is no relationship between the accepted number of oscillations and the order of progression of the colours: the numbers rise by

a hundred billions and you are still in the Red ; on the other hand, a few beggarly billions, perhaps ten or twelve, suffice to lead you out of the loveliest green into the darkest blue. It is a still greater tax upon you that you should believe that Red and Violet, two colours that so imperceptibly merge into one another that no art can draw a line between them, are the extreme opposites of one another, the one called into being by the slowest of all oscillations, the other by the absolute fastest. Again, spectral analysis has taught us that flames which present exactly the same colour to the eye consist of rays which occupy a totally different place in the Spectrum, and must therefore, according to the Physicists, correspond with different numbers of oscillations.³⁸

I might go on for half an hour upon this subject ; for so soon as mathematical physics tread upon the domain of colours, we wade up to our mouths in the thick slime of impossibilities and irreconcilable contradictions. As, however, I am not prepared to go minutely into this matter, and as it is nevertheless my duty to convince you that it is no private opinion of my own which is forcing itself upon you, but that I am expounding undeniable facts, I should wish to recommend to you an excellent *Kompendium der Physik*, of which I made special use in my student days : it is comprehensive, clear, and strictly scientific.³⁹ In the first lines of page 536 you will find these words, "our eye distinguishes different colours, which originate in the fact that the number of oscillations which strike our eye in the same unit of time is different." Now does not that give the impression of a perfectly concrete, reliable fact ? The Dogma, like the *credo* in the catechism, comes first. Then the honest author brings forward a whole string of considerations, which are certainly not meant as objections, for that Colours are oscillations is a Dogma—Cursed be he

who would look upon the sacrosanct oscillations as a mere scheme for calculation!—but these very considerations compel the author to a confession which you will find on the last line of the same page,—“Hence the perception of colour must be looked upon as a purely physiological fact for which physics have no further explanation.” Thus in the first line the physicists’ explanation of our perception of colour is given in concise language, and in the last line comes the confession that physics can give no possible explanation of the fact of the sense of colour. If we are to bring the two assertions into harmony we must premise that the Physicist makes a distinction between colour and the perception of colour. If he is speaking of colour, the word means no more to him than an *epithetum ornans* for “duration of oscillation,” there exists no interdependence between Colour and Eye, colour is an objective physical phenomenon; he talks quite calmly of rays which are sensitive to red,—not made sensitive by red—as if every wave-length wore its own livery;⁴⁰ but so soon as his Physics take the eye into consideration the whole artificial thought-phantom collapses. Light, the whole fabric of waves, of rays, and of polarisations,—all is well and good until it clashes with the human retina; but as for colour, there your hitherto all-powerful juggler must confess himself beaten: here is a sensation which his physics will not help him to explain, and now comes the physiologist whom he himself called in, and if the physiologist is like Johannes Müller, a true philosophical spirit, he will tell the physicist, “with the exception of the purely optical mathematical definitions upon the subject of elementary motions, your doctrines all rest upon the most obvious contradictions: Light is energy of the senses, and colour is an affection of the optic nerve.”⁴¹

We need go no further. We have reached the core of the matter. If you had already studied Kant, a word

would have sufficed, and you would be able to survey the whole lie of the land, as one looks down from a lofty mountain peak upon the structure of the country below. That is the point to which you must be led, and you must once more be guided to an understanding of Kant before you have had the opportunity of studying the philosopher himself.

Stand at the windows of this room and look out ! What do you see ? The green of the meadows, the blue of Heaven, the yellow of the corn, the white of the snow mountains, and the grey of the clouds. All colour ! The whole of your Seeing consists in a Seeing of Colours ; the conception Light is an abstract one, it is a collective name for all Colours. For if you consider the sources of light, such as the sun, the stars, and the flames and lamps which we use for the production of Light, they are in reality generators of Colour. Light without colour would be a *contradictio in adjecto*. Indeed, there is no such thing in existence as a white light. If a source of light appears to us as white, it is only a question of relative brilliancy, or else it is owing to the absence of any object of comparison. The old-fashioned street lamps of oil appeared to be of a deep orange-red colour when the gas lamps were near them : gas flames are orange-coloured, incandescent lamps red, incandescent gaslight that seems so dazzlingly white is blue when seen near powerful arc lights.⁴² Whatever the eye takes in is Colour : everywhere Colour. And even white and black, notwithstanding that the careful observer is obliged to consider them as something special which he cannot without further elucidation put into the same category with the other colours, and though optical analysis teaches us that no active light contains them, still will be regarded by every independent thinker, as something related to Colour—as something positive. White is just as much as black a *privazione de colori* ; physically it is the result of

every exact mixture of two antagonistic colours, for instance, of yellow and blue, or of red and green, because the one visual impression cancels the other. It is impossible for us even to think of anything absolutely devoid of Colour; it would simply become at once invisible. But I would not have you believe that I am trying to prove Light to be a mere cobweb of the brain. That would be nothing but sophistry. But in the same way as out of the experience of various tones I construct for myself the idea "Sound," which thenceforth assumes consistency, and under which all the phenomena which the sense of hearing perceives may practically and theoretically be gathered together, so out of the experiences of my eye which one and all can never assume any other form than that of Colour,—because every affection of the nerves of the eye is Colour,—I abstract the universal conception of "Light," and if the expression "abstract" should seem too strong,—remember I am developing no system, and am not weighing my words in a scale—we will substitute the word "derive"—the conception of Light is a thought derived from the perceptions of Colours. Do not run away with the idea that these are hair-splittings; rather are we dealing with a real distinction, with a distinction which the slightest reflection makes clear, and once made clear, may of itself suffice to render impossible the eternal confusion between the mathematical optics of the Physicists and the doctrine of Colour of Goethe, which rests upon a close observation of the perceptions of our sight. Colours are a rock against which not even the force of a Hercules can prevail. We can neither add to nor detract anything from the conception of red and blue; and moreover they defy any attempt at definition. As Descartes says in his simple language: *En vain nous définirions ce que c'est que le blanc pour le faire comprendre à celui qui ne verrait absolument rien, tandis que pour le connaître il ne faut*

*qu'ouvrir les yeux et voir du blanc.*⁴³ The conception "Colour" possesses no comprehensible element; it is, to speak physiologically, pure energy of the senses, and to speak philosophically it is a sensation and empirical perception. Light, on the contrary, is a matter of comprehension: in this case the understanding meditates upon material afforded to it by the senses, and for that reason the circle of this comprehension is uncertain and unstable: it even lies in our power to widen it or contract it. Under examination you would probably hold Light and Visibility to be the same, and Goethe's startling assertion that Light and the Eye are one and the same,⁴⁴ would at once charm you as a sound truth: yet, as you have seen, to Physics the conception of an invisible Light—therefore of a day that is night—is familiar, and science for the moment finds itself at a critical point where a new extension is gradually being acquired by this already widened conception, and not only invisible visibility, but Light which is not Light is accepted within the circle. For we are so far on the road towards comprehending in one united idea the phenomena of Light with those of electricity, of magnetism, and other molecular phenomena. This thought is not so new as the gentlemen of the Press, upon whom the modern world depends for its culture, imagine. You might almost say that it is seen as a germ in Plato's *Timaios*, and at any rate Descartes saw it floating before him, even though the phenomena of electricity were too little known in his time for him to entertain more than something like a general presentiment upon the subject. Herder, in the 2nd chapter of the 5th book of his *Ideen*, makes mystical allusions to the Identity of Light, Æther, the Warmth of Life, allusions which have no scientific value, but which show how near the same thought was to him. Kant, however, in an earlier writing (1763), says, "There are strong reasons for presuming that the expansion of

bodies by warmth, Light, electric power, thunderstorms, perhaps also the power of magnetism, may be various manifestations of one and the same energetic matter which is distributed in all space, namely of the æther."⁴⁵ And in his last unfinished work, he had very accurately served as pioneer to the modern theory, by the hypothetical acceptance of his "material of Heat or Light," as a universal *primitive movens*.⁴⁶ This idea is one which it is no longer possible to lay aside, and if we then claim for Light that it is a "peculiar form of motion" of the electric waves, or for Electricity that it is a "peculiar form of motion" of the Light-æther, that is *bonnet blanc, blanc bonnet*, and is decided by practical considerations or arbitrarily. The conception Light is either so extended that visibility only becomes one phenomenon among many, or so contracted that Light itself only forms one special case inside a greater complex of molecular phenomena of movement. The various Colours, red, green, blue, yellow, orange, black, and white, on the contrary, remain what they have been from the beginning of time: on the one hand something entirely objective, a perception grasped by the understanding which no thought could have generated, but only the practical sensation caused by the object,—and at the same time entirely and utterly subjective in so far as Colour lies altogether in my eye, and is an expression of my purely personal relation to the object. Since then Light possesses the elasticity of all that is thought, Colour is an immovable phenomenon firmly wedged in between Object and Subject, coyly rejecting any arbitrary handling.

You now know exactly why our exact science has had such noble successes in the investigation of Light, whereas its dealings with Colour have led to such a jumble of impossibilities and contradictions, that the world is puzzled and the specialists who have any literary scholar-

ship begin to look up to Goethe as to a "Paradise Lost."⁴⁷ The conception Light is from the first derivative, inferential, the child of our human brain, torn away before its time from its mother,—the perception of the senses,—and so we may deal with it as may seem good to us. Not, be it noted, in the sense that would allow us to invent or to ignore experiences or to turn them upside down, but in the sense that we should guide our experiences from the outset on the road which they should follow in order to reach the arsenal of our Knowledge. That is the "supplying of synthesis" of which Kant spoke. The changes with which the Scheme has from time to time to put up, are but adjustments to facts which cannot be forced into the chosen road. Thus Newton's idea of Light as motion differs from that of Descartes,—Huyghens', again, from that of Newton,—Young's from that of Huyghens; and here again we are brought face to face with deep-reaching changes. In this connection it is neither the most philosophical intellect nor the powerfully seeing Eye that will work with the greatest success, but the man who like Newton, gifted with the greatest aptitude for mathematical combination, possesses into the bargain the sure instinct for the practical adaptation of what he sees to that which is abstract and capable of calculation. John Locke long ago made the remark that Newton's greatness consisted in the discovery of intermediate ideas.⁴⁸ As an observer of nature, Newton is not worthy to loosen the latchet of Descartes' shoe. Descartes' inspired thought of the movement of a propagating medium was too lofty for him, he could not conceive of Light otherwise than as matter thrown out by luminous bodies; and his eye was so innocently unsophisticated that he felt compelled, two hundred years after Leonardo, to hold fast to the biblical number seven in relation to colours, and in his remarks about the colours of shadows, fell into blunders about contrasting colours and the like, which any decent student of Painting

in Italy could have pointed out to him. And so his painting theory of emission with his doctrine of colour has gone the way of all manifest falsehood (not to say absurdity), and at the same time his whole conception of Light, including what was imagination and what was perception, tumbled to pieces. And then what remained? Why do we all honour Newton as an immortal investigator? In the first place there remained the calculations of one of the most marvellous masters of figures in the world's history, of an intellect specially incomparable in combinations; for Newton is an unerring teacher when he remains within his own mathematical domain, the domain of observation peculiar to the human understanding: all that lay to the right and to the left of these calculations, the thoughts which gave birth to them, the perceptions to the explanation of which they were directed, all might be false, but the calculations themselves were none the less correct. The next point is that Newton not only employed calculations which never can be upset, but that his intellect proved to be true in everything which might even indirectly be calculable, especially in the invention and ordering of experiments having for their aim the reference of phenomena to movements capable of analysis. For example, the phenomenon of Colours, as to which Leonardo had made such keen observations, had no meaning for him. Never would he, like Goethe, have been led on the path of science by the sight of an aquamarine landscape with a purple sky in the snow country: the great Colour-phenomena of nature,—the blue of Heaven, the green of the thicket, the white of the snow—are all emblems of rest: Newton hardly saw them. But, on the other hand, he did remark in his dealings with optical glasses, that if you press one glass surface against another phenomena of Colour arise. Here Colour stood in relationship to motion, and to a measurable manifestation

of power : here Colour must be pressed into the service in order that it should give birth to mathematical Physics ! In Newton we have to deal with a mode of sight which is practical and also at the same time intuitive, on account of which, even as a contradictory contrast, it may be placed in a parallel line with the method of seeing of the artistic genius. That is why Newton's calculations remained a great generative principle for future science ; that is to say, what he created—not its theory, but its practical ideas, and that implies the setting out of a number of points of contact between the mechanism of human thought and the mechanism of nature, the inventive achievement of an abstract artist. This side of the Newtonian intellect,—and this alone,—it is to which the word "genius" applies, for here we see intuition and a bold combination of elements lying far apart. This recognition of the incomparable importance of Newton has been expressed in poetry by Albrecht von Haller, the great investigator of Nature, when he says that he—"Find't die Natur im Werk und scheint sie selbst zu meistern"—finds nature at work and seems himself to master her.⁴⁹ To master Nature ! that is not only the goal, but also the method of exact science, which shrinks from no violence of thought ! Thus, for example, Newton's theory of gravitation rests upon two directly irrational assumptions, empty space and forces working at a distance :* and it strides away over every observation of the senses, as we have just seen in the case of Colours : with this intent it builds for itself a kingdom, a kingdom of its own, in which observation of the senses has no place, which is at once quite abstract and quite practical.

This contrast leads us at once to a clear view of what Goethe's natural investigation strove for : a kingdom of that which is purely seen and unconditionally true. The

* Forces working at a distance : e.g. the moon acting upon the ocean.

two methods are diametrically opposed to one another. They take up no challenge : there would be no need for them to fight, if it were not that passion is apt to take the place of insight : indeed, the one might consciously help on the other, which so far has only occurred involuntarily here and there ; above all, it would be necessary that all men of culture should as clearly recognise the relation, as the relation itself is clear.

But before applying all this to the understanding of Goethe, I must say one word more. For sufficient reasons I have in this lecture hitherto only incidentally alluded to Kant, yet as a matter of fact it is he who has been my guide : it is to him that you owe any intelligence that you may have gained. To show this more accurately would require a too minute enquiry into pure philosophy. Still, I should be loath to conclude this consideration of Exact Science without having, at least aphoristically, made two points, first to prove how correctly Kant grasped the essence of Science, and secondly how undeniably Science itself, insensibly and involuntarily, bears witness to the truth of his philosophy.

From what I have already said you know how devoted Kant was to Science, subordinated to the exact method of mathematics ; how entirely he was at one with Leonardo in the belief that that alone was *vera scientia*, and that *nulla cortexza* was to be found except under its sovereign rule ; you would therefore not suspect that he could possibly wish to degrade it. In one monumental sentence he gathers together all that we have been learning about it, and I should like you once for all to impress that sentence upon your memories, because in it he is laying down something that hardly any man knows, and yet which we all need to know. " Physics are the investigation of Nature, not by experience, but on behalf of experience." Here we have the essence and the value of exact science enunciated and defined. I take it that

after what has gone before any commentary is superfluous. Your own knowledge now bears witness that Kant is right. But if the wisest heads amongst us are in doubt about it, if they go on confusing method and matter, if they imagine that it is by experience that they have laid it down as a law that colours are "a varying number of oscillations of æther," whereas all these putative oscillations are, lock, stock, and barrel, only a method "on behalf of experience," that is to say, a method invented to widen the domain of experience, but not a method for coming nearer to what is experienced by so much as an inch:—then there arises the lamentable confusion by which we are now surrounded, and by which that principle of our being, which may be described as the innocent, the feminine, the receptive, and the parturient principle, namely Perception, is cruelly imperilled.

I will say no more about this at present. Even if Kant is here only speaking of Physics, you know that all science of necessity strives after Physics—and so this method of investigation, not "through" but "on behalf of" experience, forces its way even into those sciences which are still at pains to tear themselves away from the matter of experience. For example, the essence and value of Darwinism consists in the fact that this doctrine revealed a method on behalf of experience. Darwin, like Newton, did not see clearly, and still less did he think deeply; his, like Newton's, was a practical inventive intellect, utterly without reference to Nature, and that is why the success of his labours was an enormous addition to the matter of experience.⁵⁰ We shall return to this in a later lecture.

And now one more word about the way in which the whole history of our exact sciences bears witness on behalf of Kant. We are indeed standing upon the highest peak of a metaphysical mountain; I wish to

make just a tiny rift in the mist which shrouds every man who has not yet grasped the thought of Kant, I wish just to open out a little streak of the blue sky, and by way of commentary to bring into play not Abstraction, but the practical history of our sciences.

Democritus, up to whose time the philosophers had regarded the original characteristics of matter as qualitative, looked upon the "Qualitative" as being really quantitative. That was a bold stroke, but it was a bold stroke which made Science possible. It was from him that Newton took the two important conceptions of the Atoms and Empty Space. Once admit that everything must be Quantity, then, in order that it may have form everything must be Motion: hence these two suppositions. This method of investigating "on behalf of experience," is called the Mechanical Method. Inside the same frame another method stands in opposition to it, the Dynamic: this was founded by Descartes, preferred by Kant, introduced by Faraday into Physics in opposition to the Newtonian conceptions, and Heinrich Hertz was intending to establish it *in extenso* when he was snatched away by death. It is the method of the more profound thinkers among the investigators of the exact school, which makes havoc of the absurdities of the mechanistic views. In this dynamic method a space filled without a gap is presupposed in which not hypostasised forces acting in empty space, but displacements, are the cause of all motion, and since experience is insufficient to make the calculation correspond, invisible masses and unseen movements have been invented in aid.⁵¹ Outside these two methods there is no possible mathematical interpretation of Nature.⁵² The exclusive stress laid upon Motion is common to both. But what is it that motion presupposes? Time and Space, nothing else. Space for the "outer sense," Time for the "inner sense." And yet there is a third presumption: for "in

Space, taken as such, there is nothing movable," and "it is not Time itself that changes, but that which Time contains." In order then to be able to speak of Motion we require, outside of Space and Time, "the perception of a presence and of the succession, or consecutive ordering, of its rules, consequently of Experience." If then we follow up the history of our exact sciences,—whether we build upon Mechanism or Dynamism,—we discover that it is their principle to adopt a minimum in the matter of Experience. Time and Space, with Motion as third: for anything more they have no use. They remove from Experience everything which has no reference to Time and Space, and consequently cannot be brought into any relationship to Motion. The sense of the colour red, of the colour blue, is certainly Experience, but it is not the Experience of a "consecutive ordering." Blue is blue, blue is not red—and even if I construct for myself a scale of colour, it still hardly possesses a greater value than does the idea of the metamorphosis of the bones of the vertebræ. For this conception of colour and of the scale of colour has nothing to do with Space, and contains no imaginable relation to Time, and so affords not the slightest point for mathematics to lay hold on. The Physicist therefore starts not from Colour but from Light, and even that he only seizes hold of where it suits him. The mirroring of outlines, the refraction of images, e.g. when seen in water; that is his starting-point, and indeed because there are here angles, and therefore something capable of measurement and calculation. The so-called Dioptrics, or science of refraction, preceded the mathematical theory of colours by a century: Kepler founded it in 1604, Newton's experiments upon the "Colours of Light" appeared in 1704. It then became a point to discover some relationship between refraction and colour. You can easily obtain a simple and correct idea of the nature of Newton's

work with the prism in the interests of this discovery. If you construct a light-tight box, and make a hole in it with a fine needle, you will obtain on a photographic plate, if placed at the right distance, a beautifully sharp picture of the whole landscape. If in the same way you catch a so-called Ray of the Sun, then you will obtain a picture of the sun. But if you enter the *camera obscura* yourself, and draw this Ray through a prism, projecting the broken Light upon a screen, you will no longer see the picture, for it is ruined past recognition, but in its place you will see colours, and those colours will be in a fixed consecutive series. That this experiment does not carry us very deep into the essence of colour, as colour, is shown by what follows: you saw, just now, how lamentably the Physicist fails as soon as he reaches the point where colour really exists, that is to say, the Eye; but that troubles him little; for his principle is, as we have seen, to give a minimum of importance to experience: he does not work "through" experience, but "on behalf of" it: and now he has what he wants: the Colours at which he could in no other way arrive are brought into relative position in space fixed by law, that is to say into a geometrical consecutive progression, and that again means geometrical Motion; and so he can also measure and calculate.⁵³ "The mathematician," says Kant, "can enter upon his construction of a conception from any *datum* that he pleases, without thereby being under any obligation again to explain that *datum*."⁵⁴ Not only does the mathematician pay no attention to anything further, but he consciously and of his own free will pushes it aside, together with everything which makes Colour what it is: all that concerns him is Space, Time, and therein Motion: colour is for him a number of oscillations and nothing more; not indeed because he has in this fashion fathomed the depths of the matter, but because he lacks the power to move one step nearer

to the true essence of anything, by means of scientific methods.

Rather than follow Goethe in his indignation over all this, we will learn to look upon the methods and successes of the exact investigator as a testimony to the correctness of Kant's fundamental conceptions of the human intellect. Kant teaches us, as you heard in the previous lecture, that there are "two branches of human intelligence; namely, the senses and the understanding, by the first of which objects are given to us, while by the second they are thought." What our senses give us we call Perceptions. For to-day let us leave on one side the one branch—the understanding. Let us talk only of the senses, the source of our perceptions.

Within the senses we must learn to distinguish between the two parts of which Perception is composed, for that is the foundation-stone of the Kantian building: in every perception of the senses one part is empirical, the other part pure. The Greek word *empeiria* means nothing more than experience, but our more refined analysis needs the word experience for a special meaning. We will therefore not rebel against the expression "empirical." The empirical part of Perception is then that which we receive by sensation; everything that you see, smell, hear, etc., is,—in so far as you take into account this impression only—empirical Perception. "The impressions of the senses give us the first occasion to bring about experience." But before you can perceive as object an object afforded by the senses you must add something which is equally Perception, though not empirical Perception,—that is to say, not an impression of the senses, not a feeling received from outside, but something which you yourself contribute as man, and which Kant calls Pure Perception in contradistinction to the other Perception. This pure Perception is the idea of space. As Kant says, "the conception of space is the

form in which our senses perceive, and is innate in us before ever a concrete object has impressed our senses in any one particular direction.”⁵⁵

I do not wish to-day to embark upon metaphysical discussions : and so I lay hold upon a concrete argument. You are aware that Natural Science has been developing itself, unhappily, out of touch with Kant,—for the most part in violent opposition to all philosophy : even such a man as Helmholtz, who busied himself much with Kant, yet in many essential points utterly misunderstood him ;⁵⁶ now I should like you to take up the work of one of the most rabid anti-metaphysicians of our day, yet a pre-eminent and trustworthy investigator ; Mach’s *Analyse der Empfindungen* (The Analysis of Sensations). Here you will find, p. 93 of the 2nd edition, 1900 (104 of the 4th), the assurance that the biological and psychological investigations of the nineteenth century have led to the conviction that “*the perception of space is born with us.*” As we do not propose to go deeper into this subject, this testimony, which is above suspicion, may suffice ; it comes from a quarter in which for a whole century men have been labouring to prove the contrary. Mach and the men of his intellectual school are certainly of a very different opinion from that of Kant : there are millipedes that crawl upon the ground and eagles that soar in the air ; both have the right to live, and it would be foolish to exact that they should view the world from the same point of sight ; yet the recognition acquired with painful honesty that “*the perception of space is born with us,*” expresses the same fact as Kant’s irrefutable metaphysical creed—“*the conception of space is present as a form of our sense-perception,*”—and that means the conditional possibility of all experience—“*before a real object has fixed itself upon our senses by perception.*” You must not fall into the absurd mistake of supposing that Kant meant that Space is not something

really present ; on the contrary, he calls it on that very account *pure perception*, because Space is the fundamental condition under which things in general " manifest themselves to us," and thus at the same time determines the root of all perception. Moreover, you must understand that this pure perception by itself would serve us little ; for, says Kant, " the Material or Real which is to be seen in Space, necessarily presupposes perception, and independently of that perception, which exhibits the reality of something in space, can by no force of the imagination be invented and brought into existence." Indeed, Kant gives here a fine definition of sensation when he says, " it is that which describes a reality in Space." We are not then floating in the clouds, but are working on behalf of knowledge attainable by every thinking man, and without which he can rightly grasp neither Goethe's investigation of Nature nor exact Science in its essence—and what we recognise is that in everything that nature in such generous measure brings to our senses, we must, within the limits of sensitive perception, and without reckoning all that our understanding afterwards adds to it, distinguish between a " pure perception " which constitutes form, and an " empirical perception " which constitutes the matter of perception. We can apply the saying of Aristotle which I quoted at the beginning of the lecture : within the limits of the perception of the senses there is passivity and activity ; the conception of space is an " activity " of the human intellect, it is the condition upon which that which is perceived by sensation (and that is " passivity ") can be viewed.

Now for the application of these considerations. Everything that is size, form, and quantity, manifestly belongs to the conception Space, and that means to the domain of pure perception, to the domain of form, to the domain of the necessary purely human condition

of activity. Here arises the plain certainty of mathematics. There are people who cannot see red, others who cannot see blue; empirical perception, that is to say the capability of grasping sensations, differs in different individuals; but there is no man for whom the sum of the three angles of a triangle means more or less than two right angles. Again, I can in my mind construct a cone, that is to say perceive it, and out of this perception develop all its mathematical essentials, without ever having had a cone presented to my empirical perception: while, on the contrary, I could never invest the cone with a colour or a smell, unless they had been previously known to me by the perception of the senses. If then in my investigations of Nature I confine myself as far as may be to the pure side of perception with the utmost possible neglect of the empirical side, I shall be in the enjoyment of two great advantages. In the first place, I take into consideration only that which is absolutely certain and universally valid,—the Formal, as you have seen, in opposition to the Material; secondly, as I am, so far as possible, limiting myself to my own peculiar human domain, I am able on the basis of fewer experiments to hurry on to further experiments, just as I investigated the essentials of the cone (that is to say, its mathematical essentials) in my brain. Empirical perception, that is, the perception of the outer senses, brings me at every step something new, something that I never had seen before; whereas pure perception is despotically confined to sure and fixed ways. Every voyage of discovery, every net that is sunk in the depths of the ocean, brings to light new forms of life, forms never suspected, never anticipated: every year chemistry discovers new elements; with modern telescopes the number of the celestial problems has only been multiplied: on the other hand, Newton's calculations are to-day what they were yesterday, and ten thousand

years hence they will be just as true: they are more firmly built than the Pyramids of Egypt; they lay down the tyrannical law of our own human intellect, the law from which we cannot escape, and with which we "master Nature." Here, therefore, in the domain of pure perception, mixed up as little as possible with empirical data, I can work on behalf of experience, and can give to the results of experiment a safe, incontrovertible expression. For "empirical perception is only possible with the help of the pure contemplation of space and time; what Geometry says of the former, therefore, holds good also, without any possibility of contradiction, of the latter." Here, and here only, we obtain a firm grip of the latter. That is the *somma certezza della matematica* which Leonardo so rightly saw and honoured as the ideal for all scientific investigation. While in other fields the attempts at exact research are subject to change, so that as Kant says "only fleeting steps are possible, of which time preserves not the slightest trace, in mathematics, on the contrary, its progress is along a high road which the most remote posterity will be able to tread with confidence." That is why exact science,—and to be exact is the strenuous endeavour of all science,—confines itself to Size, Quantity, Form, Motion: in its ultimate perfection it postulates empty Space and Quantity—nothing more (see page 131): so when you see that it cannot altogether brush away the qualities of which empirical contemplation tells the tale, as for instance Colour, it bends and forcibly changes them into Motion, true to the principle formulated by Kant, "everything that is real in the objects of the outer senses must be looked upon as Force in Motion."

In this little exegesis I have for simplicity's sake always made use of Kant in order to render intelligible the essence and progress of our exact Science: but now you need only invert the whole story,—you need only

recall what I have said about physical optics, and you will understand how I was justified in maintaining the proposition that our science bears witness to the correctness of Kant's analysis of the human intellect. It is the proof derived from experience that he saw aright.

I have spent so much time over Leonardo's goddess, exact science,—that I have hardly any time left for Goethe's unmathematical method of perception. Yet I must hold this to be but a small evil. For as soon as you have grasped the essence of exact Science, you almost automatically obtain as a result the essence of that observation of Nature which prefers the empirical method, the impression of the senses, while it as far as possible pushes on one side the so-called "pure method of perception" as a mere formal principle, and only takes it into consideration where it touches the empirical and unites itself therewith, namely in the case of Form. "Quantity and mensuration in their nakedness," writes Goethe, "annihilate Form and banish the spirit of living contemplation."⁵⁷ Red is 400 billions of oscillations of the hypothetical light-æther in the second: we may well agree with Goethe in calling that a banishment of the spirit of living contemplation. It is in this spirit, in the spirit of living contemplation which has been banished by his opponents, that Goethe's observation of Nature is rooted. In order not to break through the circle, we will hold fast to his Doctrine of Colour.

You remember how the physicist Helmholtz tackled the subject. First came an abstract definition of Light, then a rich mass of possible constructions of the "illusion," as Hertz calls it, finally came the question of Colour. Goethe on the contrary starts with Colour. "All Nature," he says, "reveals itself by Colour to the sense of the eye."⁵⁸ He declines to speak of the essence of Light: "no mortal will ever be able to explain the nature of Light; and even should any man be able so to

do, he would find no one to understand him or his Light." More comprehensive still is the passage in the preface to the *Farbenlehre* (doctrine of colour). "For really it is a vain undertaking to pretend to express in words the essence of any thing. We perceive results, and an exhaustive history of these results might at the most embrace the essence of the thing. In vain we take pains to portray the character of a man: but show us his dealings and his deeds together, and a picture of the character will arise. Colours are the *deeds* of Light, its activities and passivities. In this sense we can hope from them to obtain disclosures about Light."

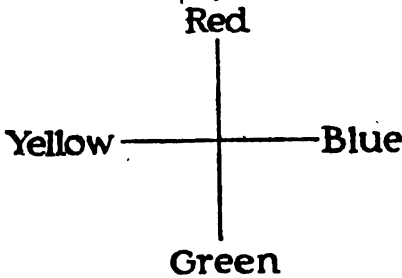
I would not add a syllable to this: the Master has in these few words said all. My one wish would be that you should make friends with that beautiful, precious work, and learn to see through Goethe's eyes.

I should gladly have said a little more about the Doctrine of Colours, but it would lead us too far. Only one thing I must say. If a brilliant process of discovery has testified to the value of the mathematical method, equally a century of experiments has led to the result that Goethe, and Goethe alone, has correctly observed the phenomena of Colour. In the matter of the Doctrine of Colour, Johannes Müller is already out of date; Helmholtz, whom we have only just lost—out of date; Hering, who is still with us—out of date;⁵⁹ Goethe, on the contrary, as a younger professor has recently assured us, "comprises the foundations of the most modern opinions"; and that will hold good a thousand years hence. It is no part of Goethe's endeavour to find a theory, that is to say a mathematical formularisation. When his brother-in-law, Schlosser, asked him how far his Doctrine of Colour might agree with the hypothesis of oscillations, "I had unfortunately to confess that my method took no notice of the matter, but that the only object was to focus innumerable experiences, to set them in order, to

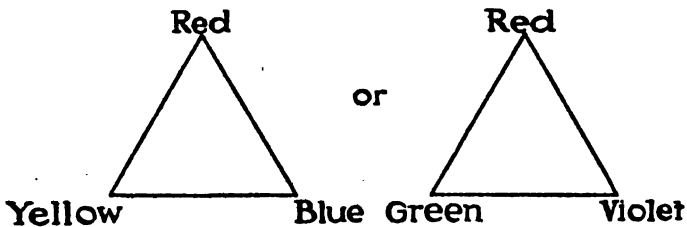
discover their inter-relationship and their position as opposed to and as agreeing with one another, to make them generally comprehensible."⁶⁰ My further lectures will show that this position of Goethe's corresponds exactly with Plato's and Kant's critical method of the understanding of phenomena, in opposition to every childish attempt at their explanation. Goethe's Doctrine of Colour is the almost spotlessly clear reflection of empirical observations, and this is a more difficult undertaking, and needs more training than the use of mathematical instruments. The student in his very first term can make spectroscopical experiments—I know it from my own experience; but to have such a clear insight into Nature as Goethe had, that is a matter of genius and self-education. Goethe himself bore witness that he was "not gifted with keen sight"; Leonardo's eye, on the contrary, pierced like a dagger into the very heart of phenomena; but I think that our theoretical endeavours will have rewarded you by enabling you henceforth to distinguish between keen sight and clear sight: if we accurately consider the schematising of the plastic artist, with which we dealt at the beginning of this lecture, we shall find it to be under the domination of the same despotic spirit that rules the schematising of an exact investigation: that Goethe could not paint does not only originate from any deficiency, it may also be looked upon as the positive quality of a spotlessly clear sight. And it may well be that this most rare quality accounts for the fact that people have not even understood how to read Goethe. To this day you will find in every book about Goethe, whether it be the work of friend or foe, the assertion that Goethe taught the existence of three primitive colours, Red, Yellow, and Blue, and that he held green to be a mixed colour. Now if the book in question is under the influence of Helmholtz, you will be taught that Goethe was mistaken, and that the three

primitive colours are Red, Green, and Violet: if the book is more modern, it will probably prove to you with ease, that the idea of three colours is nothing but an absurdity, since all phenomena of contrast show that colours run in pairs, and therefore that, as main ideas, we must in every case accept two, or four, or six, or some other even number of colours. Of these, as Leonardo was the first clearly to recognise, Red-Green on the one hand, Blue-Yellow on the other hand, are without a doubt to be accepted as primitive colours. To set up primitive colours, on the contrary, as Helmholtz did referring to Young, and at the same time to leave out Yellow and Blue, means a ne-plus-ultra of the art of combination devoid of all observation.⁶¹ If you take Goethe himself in hand, you will be amazed to discover that it never occurred to him to teach the doctrine of three primitive colours. It is true that he asserts that painters and colour-makers start from three colours because out of them they can obtain all the others;⁶² but he himself fixes no number as a general proposition, but only affirms that colour proceeds from two extreme starting-points; nearest to the light a colour arises which we call Yellow: another one nearest to darkness arises which we describe by the word Blue.⁶³ And so far as the culminating point of these two extremes, leading through Orange on the one side, through Violet on the other, is Red (the Zenith as Goethe calls it);⁶⁴ while the depression of these same extremes through Yellow-Green and Blue-Green, reaches a furthest point called Green (which Goethe calls the Nadir):—so far we may certainly talk of four primitive colours as Goethe sometimes does. We might therefore in Goethe's case speak of two or of four primitive colours, but never of three. But the truth is that in his view colour is a unity; that is why he once suggests that Red includes all other colours.⁶⁵ But colour might equally be considered as a duality, inasmuch as "there are only two quite pure

colours," Yellow and Blue."⁶⁶ Here, as you will surely observe, the fundamental idea is form, not the conception of Numbers. And for that reason, unless I am mistaken, our most modern physiologists with their purely mechanical conception of colours are not so near to Goethe as they themselves fancy. It is true that their colour-cross



has set us free from the silly colour triangle,



and every empirical truth here signifies an approach towards Goethe, but I am afraid that Goethe must still wait a while before he becomes quite modern. True, he has said that to understand his teaching "needs nothing more than clear vision and a healthy brain." At the same time he has expressly declared that his teaching "is harder to comprehend than Newton's."⁶⁷ Clear vision is as good as non-existent among us; we had to wait for Goethe to teach us that.

And so we arrive at the answer to the question which rendered this excursus necessary—whether what Goethe

aimed at, in express opposition to Leonardo, namely an anti-mathematical, and so far illogical and unscientific, comprehension of Nature, was not profoundly justified? I hope that the question now presents itself to you in a quite different guise and stripped of all phrase-mongering. You have seen with your eyes the might, and at the same time the beggarly poverty, of the whole system of pure science. "The mathematician is master over Nature," says Kant rightly enough, but what does the master know of his slave? Nothing but the work with which he has entrusted him. Goethe faces nature in a quite different spirit, and therefore with a different intellectual conception. His is not the ambition to master Nature, but to possess her intimately: she is not to work for him, but he for her; he wishes to re-create her and so make her his own. Exactly as we just now recognised Colour as something at the same time quite subjective and quite objective, so he paves the way for a view of Nature that shall be quite Human (without which it would be incomprehensible), and at the same time Pure Nature, or perhaps it were better to say as nearly Pure Nature as possible. Mathematical Physics are, as you have seen, something painfully abstract: for whilst, as far as may be practicable, it pushes on one side empirical observation, it not only denudes things of their essential nature, but it robs me as man of all the direct perceptions of the senses. There remain nothing but ghosts flitting hither and thither between object and subject. That Red can be understood as 400 billions of oscillations in the second is a most important formula for science, and therefore for practice: for life it is absolutely without significance. *La meccanica è il paradiso* was no conviction of Goethe's; he said, "mechanical formulæ change the living into the dead."⁶⁸ His wish was to teach men to look upon life as something living.

Here again there must be Method, otherwise there

would be no unity and no goal to attain. The saying about phantasy which I quoted at page 121—that it is very near to Nature and is the offspring of Nature—gives you the key. The relationship with Art is patent and sure, comforting and inspiring. But never forget that other saying about the “exact phantasy of the senses,” do not forget that Goethe saw with incomparably greater accuracy than Newton and Helmholtz. We are not dealing here with creatures of fancy, but with that which Goethe calls “the productive power of imagination.”⁶⁹ Without imagination we men are lost : only think of the waves and the rays, and the polarisation of the hypothetical medium ! But while mathematical science works with Schemes which have only been invented in the interest of the human brain, Goethe is striving to come on the track of Nature, and by the means of Symbols to discover and explain, not her mechanism, but her Ideas. On one occasion his language is as clear as daylight,—“my impulse is the embodiment of Ideas.”

As soon as we have obtained a clear notion of Goethe’s goal and method, we understand what Kant means when he demands of us that “we shall judge phenomena not only as belonging to Nature in her purposeless mechanism, but also to analogy with Art.” But before speaking in this connection of Kant who in such a peculiar fashion goes hand in hand with Leonardo and Goethe, it will fit our purpose to sum up briefly the result at which we have arrived in regard to the two ways of contemplating Nature. The riskiness of such an undertaking is well known to you, but this is not the case of a building in which we purpose to abide, but only of a milestone on the road towards the attainment of a living idea of the personal way of thinking of Immanuel Kant.

There is one mode of Seeing, analytical, aiming at a mathematical dissection of Motions,—and there is another

mode which is intuitive and directed towards an imaginary reproduction of Nature. Neither has any value unless it is exact. The material, both objective and subjective, is in both cases the same ; but the direction of sight implies as condition a deeply reaching difference ; one man is unable to see the one end of the spectrum, another man cannot see the other end : that accounts for Goethe's inability to understand the essence of mathematics,—while it equally accounts for Leonardo's one-sided preference for mathematical interpretations.

The analysis of motions leads to true exact Science. The principle of Science is the lordship of the human intellect, which imposes its law upon Nature empirically perceived. The organs of Science are Mathematics for that which is seen, the Logic of cause and effect for synthesis outside that which is seen.⁷⁰ All matter of perception that cannot be assigned to one or other of these Schemes is put aside and ignored. We may therefore describe Science as systematic Anthropomorphism. From this there result two deductions. Inasmuch as the Anthropos himself is a portion of nature, it is manifestly probable that he will be able to assimilate an important part of the phenomena of Nature according to the scheme which is specially his own ; to this the history of science bears witness. What he has assimilated according to this method is unconditional Knowledge : it is available at all times and to all men. This knowledge is not the same as reality : it is only a Scheme ; it hardly touches the essence of things ; yet it suffices for theory and for practice. That we should call the first deduction. And now for the second. On such a foundation it is possible to construct a flawless consistent building as a system of Nature, without the human intellect ever falling into contradiction with itself, without therefore any injury to the principle of thought,—correct logical sequence—and it is in spite of that possible that from

beginning to end, at every single stage, it may only have grasped a fragment of the truth. For the revelation of this fallacy which gives the lie to the whole essence of the world—(we might call it the *error ex incomperito*)—science affords no handle. A Goethe is therefore fully justified in demanding that Nature should be considered as not only mechanically logical, but also according to another method; he is only wrong when he calls this other method of observation "exact Science."⁷¹

The essence of the other form of seeing is more difficult to define, just because it is a purer method of seeing. Here the characteristic feature is devotion to Nature, the struggle to escape from the serfdom of anthropomorphism. The Principle is Love, the Aim "the contemplation of Nature's own thoughts," the Organ the senses in partnership with Phantasy. That which is thought is here incapable of being known; as the Indian sage Bartrihari says, "there are no words for this thought." Think only of the doctrine of Metamorphosis: the doctrine of colour runs on all fours with it. Yet we must always keep before our eyes what is the meaning of our so-called knowledge, and within what narrow bounds it is fixed; rightly viewed, as we have seen, the knowledge of our Science is rather a method of investigating and mastering Nature than true knowledge. By science, our powers, the physical conditions of our existence, our arsenal of the material of knowledge, are enriched. But it is only its subjective acceptation, and the elaboration into something personal, that enriches our intellect. And this is the way that Goethe adopts. Of his doctrine of colour he himself confesses that it cannot be taught, "it must be held as practical, not as theory."

Let me here make my own profession of faith. You know how greatly devoted I am to exact science; that is above any other the sphere in which, had the fates been kind, I might have been in a position to render

some service. At the same time I am firmly convinced, that the greater the prosperity of the development of exact science, the more indispensable must become a purely contemplative conception of Nature,—and that moreover in the interest of human culture. And if we wish to define this method of contemplation from the standpoint of Leonardo, that is to say from the standpoint of a strictly and logically synthetic understanding, then we must say that it is a contemplation of Nature that is devoid of causality. Pure contemplation tells us nothing of the past, nothing of the future, nothing of cause and effect. “The tracing back of effect to cause is a mere historical proceeding,” says Goethe. His doctrine of Metamorphosis is not the discovery of something that has taken place, but the setting forth of an Idea,—Idea of Nature, Idea of Man, which meet at this point : and in his studies of colour he is so far from wishing to supplant an old theory by a new one, that he blames the inclination of men to “set aside phenomena” by an explanation, instead “of making themselves acquainted with Detail by intimate sympathy, and so building up a Whole.”¹⁸ But our whole educational training makes us rather “historical” beings than creatures of the present, and those two conceptions, Moment and Sight, are nearly related. The man who in the contemplation of Nature busies himself to trace back a so-called Effect to a so-called Cause, follows the path of the mathematician : for just as the one prefers the forms of pure perception, so the other prefers the forms of empirical perception to the prejudice of experience afforded by the senses : he will see keenly, but not clearly, for his vision is troubled by thought, that is to say, by systematic synthesis according to human Laws. Experience is, according to Kant, “a product of the understanding from materials furnished by the senses” ; that it is in every case ; but it makes a great difference whether the preference be given to the

element of the understanding or to that of the senses ; exact science does the one, Goethe the other. For Goethe the question is one of reproductive, or let us say boldly, of artistic vision,—(which can only be the case when it is allied to Genius)—in contradistinction to an abstract observation of Nature which exclusively busies itself with dissection and peering into causes. If any one should teach us to suppress, not for ever, but at pleasure, this involuntarily schematising activity of the intellect in the interest of vision, and as Goethe said, of “ construction,” he would be endowing us with new eyes. Just as the mathematical method has been enriched with new instruments, so would this method of pure observation enrich us with new thoughts and images. Richer than ever before would the source of phantasy flow, because science has in the meanwhile been extending the field of the Visible. Unless we follow Goethe’s example our civilisation will evaporate into mere equations ; Goethe has shown the road to culture.

But it is not only Goethe who has shown it ; Kant has done the same. If only you should obtain a living insight into the fact that Kant,—whose eye so plainly differed from Leonardo’s and Goethe’s,—yet shares the diametrically opposed views of both men in relation to the observation of Nature, and so leads to a harmonious adjustment between them, then the patience which you have shown to-day would be richly rewarded. You know how far he agrees with Leonardo : there is no difficulty about that : to perceive the agreement with Goethe requires a finer analysis. Yet it is such a distinct feature in Kant’s being, that a few words will suffice to direct your attention to it. A later lecture will go further into this.

Kant knew exactly what constitutes the principles of exact science. He writes, “ we can speak of Light-matter, Heat-matter, etc., because they are mere fictions of forces

which contain no more than a relative conception " (Ür, III, 598). And the same man who said, " there can be no true recognition of Nature without presupposing mechanism as the foundation of natural investigation "—you know exactly what he meant by that, and how he meant it,—the same man writes in the same place, " this is in no way opposed to the maxim to seek and reflect upon a principle in certain forms of Nature, which is a quite different matter from explanation in accordance with the mechanism of Nature " (Ur, § 70). It is true that here Kant has in his head only a single other principle, that of Final Causes ; still in this work upon the power of judgment other principles come into play which only indirectly affect the Final Causes, as for instance in the great discussions over the ideas of genus and species, metamorphosis and persistence of form, etc. The Final Cause is in general, as we see in many passages, considered by Kant as of identical meaning with architectonics. We are dealing then with " Nature as a presentation of Ideas," as the same work says, " an effort," as Kant had already said in the essay on Pure Reason, " which deserves respect and following up." I would bespeak your whole attention for the following sentence. Kant says, " Taken literally and considered logically, it is impossible to represent ideas. But if we widen our power of conception . . . for the contemplation of Nature, Reason inevitably comes in, and brings forward the effort of the mind, vain though it may be, to make the representation of the senses adequate to these ideas " (Ur, note to § 29). Here is a sentence which might have been coined from Goethe's mode of contemplating nature. To widen the empirical power of representation must be its keynote. It is just this very effort to widen empirical contemplation,—the share of the senses, in contradistinction to the preference of a one-sided and so to speak abstract contemplation — which fundamentally distinguishes

Goethe's method from that of science. And notice how our dear dry Kant speaks : " taken literally and looked at logically " ideas cannot be expressed, and the attempt remains " in vain " ; yet no one hinders us from casting away the livery of the Literal, and the serf's chain of a Logic ultimately leading to absurdities, as Kant himself has shown in his famous exposition of the *Widerstreit der Vernunft* (the Antagonism of Reason). The idea " species " taken literally cannot be shown to the senses, yet in spite of that it forms the foundation of all science of beasts and plants : the idea metamorphosis cannot hold out against logical investigation, yet it is an idea which lies at the root of all comparative anatomy. Science only widens *extensively*, while on the contrary a fashion of seeing after the manner of Goethe widens our " power of representing the perception of Nature " *intensively*.

It would of course be an absurdity to expect to find ideas working in a man like Kant, who kept his eyes closed, in the same sense as they did in Goethe. Descriptions alone gave him any lively conceptions ; in no other way could he see anything. A direct contemplation of Nature, of the widening of which he speaks here, so far as Nature in the concrete is concerned, could not exist for him. Face to face with nature he could neither discover with Leonardo nor invent with Goethe. His ideas—ideas of genius—in regard to surrounding Nature, are accordingly purely schematic, purely mechanical. His theory of the heavens is a good example of the way in which the Physicist searches " for " experience. But there is also an inner Empiricism, an inner nature. And here, here where Kant is quite at home, he stands in exactly the same position as Goethe stands in relation to surrounding, concrete Nature. There is indeed a form of idea which only in a case where the eye is directed inwards could develop itself to such a brilliant clearness,

that it might at last, like the Holy Grail, blaze through the cavernous darkness, an idea whose counterpart,— what Goethe called the God-Nature,— is the idea of Freedom. The man who had followed the mechanism of Nature, not only in the construction of the world, but extending into the innermost folds of the intellectual activity of man, recognised moral independence as the highest power of human personality. That is an idea, an idea which may not be capable of being expressed, but which may well be “lived,” exactly as Goethe’s endeavour strove towards “living” the Nature around him. So long as I take as principle the mechanism of natural investigation, so long I must look upon myself as a mere machine, or as Kant puts it “a Nature which the will subjugates”; I must be able to explain every most delicate impulse of my thought and feeling just as mechanically as the essence of Light, even though I should be compelled to premise for the purpose many “peculiar forms of motion of hypothetic media.” Whoever denies that is working in the interest of obscurantism, and shows that he has no share in the blessing of true Teutonic science; for him the whole development of our knowledge of Nature from the fifteenth to the twentieth century has never existed. But does mechanism suffice for me? As a thinking and moral being am I not compelled to feel that if I go no further I am lying to myself? Does not the most intimate experience of every moment bear witness to freedom and responsibility? Does it not prove the reality of “a Nature which is subjected to a Will”? Remember how Goethe undertook the investigation of Light, not by the presumption of a hypothetical being, but by the faithful exposition of his dealings, his activities, and passivities. In the same way Kant repudiates the idea that we should search for the essence and the importance of being a man in the study of anatomy and in the comparison of the

human skeleton with that of other genera of animals—the rather “are they only to be found in his dealings whereby he reveals his character.”⁷⁸ Here you have, as you see, almost literally Goethe’s words about Light. And what does Kant, the mechanician and analyst, discover when he puts these dealings to the test? “Man’s freedom and independence of the mechanism of all Nature.” But this view determines him to hold up before us men an idea (here called *ideal* because it leads to dealings which it is our business to make perfect), which is not taken up passively from so-called revelations, —which as a general proposition is not pre-existent and waiting for our coming any more than is the idea of metamorphosis, “but which may become reality through that which we do and that which we leave undone.” Instead of theoretically debating about Freedom it is our duty to prove it by deeds; by Freedom we must realise ideals in defiance of Nature.

Here you see Kant himself enlarging upon that which in respect of man’s relation to surrounding Nature he had only discussed theoretically, namely the representation of Nature in ideas, as opposed to an explanation of her as mechanism. The connection with Goethe, which certainly does not lie upon the surface, is here so intimate and deep, that I hardly think that it is possible to understand the one man apart from the other. I do not think that you can attain a fully concrete notion, void of phrasemongering, of what Kant understands by “Independence of mechanism,” and “Freedom,” unless you dip deeply into Goethe’s study of nature; and, on the other hand, I am convinced that our conception of Goethe’s method of considering Nature remains dull, insufficient, and false, until we have realised that with him it is a question of something quite as direct, quite as truly experienced, as Kant’s idea of the freedom of the human Will. Goethe, like Kant, wishes to carry out a work of

salvation, and in the case of both men the method is the same. Kant on one occasion writes, "Two things fill the soul with ever new and increasing admiration and awe, the oftener and more persistently my thought busies itself with them: the Star-studded Heaven above me, and the Moral Law within me. It is not permitted to me to seek and only guess at either of these as shrouded in a veil of darkness, or in the Transcendental beyond the range of my vision; I see them before me and connect them directly with the consciousness of my existence." These words should remind you of Goethe's words, "Nature has neither Kernel nor Shell, she is everything at one and the same time." But for us men there certainly is a distinction between Kernel and Shell, and the inalienable tendency of our mechanical science, in other ways so admirable, is to make everything into Shell, the star-studded heaven as well as the moral law: whereas Kant and Goethe are at one in this,—that they teach us how we are to begin to show everything as Kernel, in which—each following the nature of his special gifts—the one by preference fixes his eye upon the starry heaven, the other upon the moral law.

Goethe's saying, "Instinctively I followed the same road as Kant," has grown more and more significant. It is my special hope that from Goethe's standpoint you are beginning clearly to see in its organic consistency the marvellous personality of Kant, so rich in what the superficial observer calls contradictions. Now, when you read the *Critique of Pure Reason*, and come across the often quoted and almost always misunderstood sentence, "I had to set aside Knowledge in order to make room for Faith," you will, I think, understand it, and that too, exactly in the sense in which Kant understood it. There we have a touchstone; for no man ever had a more glowing respect for exact knowledge than

Kant, and no man read into the conception "Faith" so little History and so much force of living actuality. To separate these two, Knowledge and Faith, and having done so once more directly to reunite them,—that was his special distinguishing gift.

For to-day my task is accomplished, and at the same time I leave the sphere of these two first lectures. With René Descartes and Giordano Bruno we shall climb new heights, and much upon which we have already touched will appear to us in another light. Let me, however, in conclusion, say a few words about the great artist who has rendered us such conspicuous service. For it is Leonardo whom we have to thank for the incitement, indeed for the peculiar driving power, towards those considerations which have opened up to us so clear and deep an insight into Kant's inmost heart. Unfortunately we cannot in these lectures busy ourselves more minutely with that wonderful man: still a most cursory glance will now suffice us for the discovery of more than one feature of his relationship to Goethe and Kant, and this last recapitulation will at the same time spread a bright, transparent, and protecting varnish over the colours of the picture that we have obtained.

Leonardo, who so exactly agreed with Kant in his estimate of mathematical and mechanical investigation of Nature, has left behind him proofs that he too knew how to distinguish between a Nature which subjugates Will, and a Nature which is obliged to subordinate itself to Will. He writes, *La necessità è maestra e tutrice della Natura*, "necessity is mistress and guardian of Nature,"—that is Nature as Mechanism; and yet in another place he writes, *il dono principal di Natura è libertà*, "the chief gift of Nature is Liberty," that is Nature as Idea; and the confirmation of this Idea in man he sees with Kant in the *signoria di se medesimo*, "the Lordship over himself," that is to say, what the German sage

called "Freedom from the mechanism of all Nature." This agreement is of itself interesting; it points to the fact that whoever understands mechanism as the principle of the explanation of Nature, and, without leaving the slightest loophole through which any extravagance of idea might slip in, maintains it consistently, must inevitably in this way reach a healthy idealism: the conceptions Necessity and Freedom do not exclude one another, on the contrary they mutually depend upon one another.⁷⁴ In the clearness of this recognition Leonardo is nearer to Kant than Goethe; the latter was not sufficiently a mechanist to be a pure idealist.

But we reach greater depths in this parallel if we take into consideration the relationship of Leonardo the working artist to Leonardo the man. Leonardo the theorist is a keen but inordinately strict, dry intellect. Often, in the none too easy reading of his works, I have been compelled to think of Kant. There is the same hatred of exaggeration, the same distrust of all that might believe itself to be intuition and inspiration. To his disciples he never speaks of anything else but measurements and calculations and technical practices, and he never tires of impressing upon them the "copying of Nature as in a mirror." And now let us turn from his books to his works. Is what you find a copy, line by line, of a mechanically seen form? Is it not far rather a revelation of all that is invisible, indescribable, unthinkable, "seeking in an instant of vision to concentrate a thousand experiences" ?⁷⁵ (Walter Pater). Never, with the possible exception of Rembrandt, has personality been so brought home to us: the most intimate secret of the soul rests, only half veiled, upon the peaceful features; his female heads are the living representation of what Goethe calls *das ewig weibliche* "the eternal feminine"; his figure of Christ has the significance of a fifth Gospel.

The same magic rests upon some of the pen-and-ink landscapes from his hand :

als ob da drinnen ganze Weltenräume wären
Wald und Wiesen, Bäche, Seen
unerforschte Tiefen

“ as if in them lay whole world-spaces, Forest and Meadows, Brooks, Lakes, . . . unplumbed Depths.”

And he, the empiric and mechanician, knew full well what secrets of the human spirit are here disclosed. Of works of genius, he says : *questa non s'insegna come fan le matematiche, . . . non si copia come si fa le lettere . . . questa sola si resta nobile, questa sola onora il suo autore e resta pretiosa e unica, e non partorisce mai figliuoli eguali à se.* “ This cannot be taught like mathematics or copied like letters. . . . This alone remains noble, this alone does honour to its author and remains precious and unique, and never gives birth to children that shall be the equals of Itself.” It is useless to degrade the phenomenon of the human intellect to a matter of small importance, or to deny its existence, as we daily see attempted : it is a beggarly life which we prepare for ourselves in that way. True, the merciless realist calls man *Rè delle bestie*, “ the King of Beasts,” and he laughs at the monks and “ other liars,” who talk of the miracles of “ the soul,” where he, as anatomist and mechanician, has only found nerves leading to a brain ; but now he steps up to the canvas and produces upon it an Idea—the Saviour, the *rè degli uomini*, the King of men, as his mind's eye has beheld him, a work which cannot be learnt and cannot be copied, and which can never give birth to a son like to itself. And we—we draw near full of awe, blest with happiness, enriched for all time. We do not doubt the secret connection between the great man of art, the man who investigated the geometry of space and perspective, who measured with compass and rule the position of every leaf on the tree,

of every muscle in the face,—and the man who gave form to immortal ideas ; but here again the relationship is the same as that of Kant's example of the starry heaven above me, the moral law within me : in combination they complete my being ; but as cause and effect they stand in no relationship to one another.

There are just two worlds. Two worlds which stand in opposition and in contraposition to one another, which at the same time imply and exclude one another. You may perhaps remember an important conclusion at which we arrived at the very outset of the present lecture : namely that these two worlds are sharply divided from one another : they lie separated as it were by a broad stream : on the one side a bridge, on the other a ferry, leads from bank to bank : there are no other means of crossing. The World of the Senses can in no way directly obtain access to Thought and Reason otherwise than by means of Schemes of the understanding, and on the other hand the world of Ideas can only attain visibility on condition of borrowing Symbols from the World of the Senses. That is a fundamental fact of the human intellect, a fact long suspected, and laid down by Kant for all time. Every attempt to deny this twofold existence, which is of the very essence of our nature, and therefore of universal nature, is offering up the one half of our being as a sacrifice to the other. The Mystics, among whom we must reckon intellects like Schopenhauer, either dispute the mechanical law, or violate it at many points, and thus play havoc with our understanding : the scientific Monist acts even more despotically : for while the one only repudiates the abstract mathematical, the other rejects the concrete evidence of the senses. The course of exact science refutes the first, every genius convicts the second of lying. And what I wish to impress upon your minds is that Goethe's creative ideas about organic Nature and the essence of Colour, and Kant's creative

ideas about the construction of the human intellect, and **about** the connection between the two natures, should be accurately examined and judged precisely in the same way, as we examine and judge an original artistic production due to the pure creative power of Leonardo. We have sufficient evidence that men of true genius occupy themselves with exact Science: yet it is foolish to expect creative achievements from science as such. Whatever inspirations science brings to light are not original but practical discoveries of Nature; none the less does science deserve praise on that account: but it is a higher matter when Nature in man crosses over to the work of discovery, and in a paroxysm of the intellect gives birth to a new thing. But to measure this with a yard-measure is a ridiculous undertaking. It is only the free, open eye which will convince us here, not the Logic which is like the crutch of the blind man groping his way: the two methods, combined yet ever estranged, stand over against one another like the oscillations and colour. Granted that Goethe and Kant were both technicians, yet here too there is a mysterious connection between passivity and activity, between experience and idea, between empiricism and creative power, just as in what concerns the unconscious method of life, there is a connection between Scheme and Symbol, Technics and Phantasy. No man is further removed from the bungler, no man is more industrious, than the Genius. Fifteen volumes has the Weimar edition already devoted to works of Goethe on investigations of nature; turn over those leaves if you are minded to learn how tirelessly, with what painful accuracy, how soberly, the great man studied nature. Kant on his side has surrounded his solitude with such gruesome moats and fortifications of philosophical technicalities that much courage and persistence are needed to penetrate into the interior. And just as I could not avoid criticising Goethe the

technician, so it will seem difficult to many people to subscribe altogether to the Kantian technics. But exactly as Leonardo, the mighty artist, placed ideas in living form before our eyes, so also did Goethe, the pure Seer of Nature, the founder according to Johannes Müller of a new ideal of Natural History, and so also did Kant, the august enlightener of the soul of man. Their works are creative achievements of Genius. These guide us to the inmost mysteries of nature very differently from the ways of mathematical science. For as Goethe teaches us, "the way of Nature is the way upon which you will of necessity meet Roger Bacon, Homer, and Shakespeare." This way, gentlemen, is the one which we seek to tread in these Lectures, the way upon which we meet Nature herself as she reveals herself in her noblest creatures. If I have succeeded, in ever so modest a manner, in leading you upon this road to which Goethe points, then there should arise before you the vision of three giants, Leonardo, Goethe, Kant, each standing out as a perfectly distinct personality: thrice the glorious eye of genius meets your own: a threefold stream of Light floods over your world.

DESCARTES
UNDERSTANDING AND SENSIBILITY
WITH AN EXCURSUS UPON ANALYTICAL
GEOMETRY

**Water is always like water,
but it has a quite different
taste when drawn at the
fountain head from what it has
when drunk out of a pitcher.**

Descartes.

DESCARTES

THERE are days and days, and I confess that it is with some hesitation and distrust that I address myself to-day to the task of continuing our observations in common. For now I have to travel with you through regions which it will not be so easy to make clear as it was so long as we had the eye of a Goethe and a Leonardo to lighten us on our way. The comparison with philosophers who were at the same time artists revealed to us much that was of fundamental importance, and gave rise to observations which could not but result in a deep insight into the personality of Kant, in the narrower meaning of the word, but now we must face about, we must once more fix the lenses of our eyes upon a nearer focus ; we must bring into comparison philosophers who in their turn will lead us far, but on another road ; men, the atmosphere of whose lives does not consist in Beauty and Art, but in research and thought. To-day we will busy ourselves with Descartes the critically empirical, mathematical thinker, and in the next lecture with Bruno the logical schoolman and enthusiastic thinker.

You must not misunderstand me. There is no such thing as an absolute artist, no such thing as an absolute mathematician, and above all no such thing as an absolute philosopher. This sort of classification into professions will never succeed even with half-important men. Goethe and Leonardo were both of them, as we have seen, great investigators of nature, and thinkers :

Bruno and Descartes on their side possess in a pre-eminent degree the artistic gift of putting into shape: Bruno, in his manner of thinking and speaking, is as much a poet as Plato was; and Descartes, the masterful thinker, is so penetrated with the value of perception and the empirical investigation of nature, that he is the bitter enemy of genuine professional philosophy. We, however, are dealing to-day solely with that which I should like to call the characteristic intellectual attitude. In Goethe and in Leonardo it is distinctly directed outwards: the primacy of the Eye is dominant in both, and indeed of the eye both as a receptive and reproductive machinery of the senses. It is true that we found the result to be very different in the two men; for behind two equally powerful eyes two brains gifted in varying directions take up impressions, and work them up each in its own way. In Leonardo the gift of sight is more precise and, in the widest sense of the word, more correct in its perspective; this he owes to the power, which we recognised in the previous lecture, of referring all that he saw to the inner scheme of perception; before Goethe's eyes, on the other hand, the outlines are uncertain, his power of schematising is insufficient, and he mixes up his thought with everything: but it is exactly this which bestows on him the gift of illuminating the very depths of Nature, depths where without the lamp of creative thought, dark night reigns. Leonardo sees the relationship of things to one another, Goethe sees their relationship to the human intellect; in Leonardo's understanding the masculine element prevails, in Goethe's we find unmistakable feminine or receptive constituents; hence Leonardo's thought is keen, mechanical, scientific, and easily grasped, whereas Goethe's is deeper, more iridescent, baffling conception, because it is pregnant with presentiments too wild to be tamed into words. We shall go further into this in a future lecture; for the moment

we must be contented with recognising the fact that this precise intellectual habit, the method of looking outwards, is the common property of both Leonardo and Goethe. At the same time this habit distinguishes both from Kant, even though a closer examination has revealed to us so many points of contact in the manner of Seeing between him, the artist in thought, and those two artist-sages. But now, for the sake of comparison, we will summon into court two men with essentially different qualifications,—men whose innate intellectual habit points inwards. I say “inwards” because these thinkers in the first place consult their own thought, and only later on turn to Nature: they do not trust the impression which comes from without, not, that is to say, until they have, as far as may be in any way possible, tested and dissected the whole details of the inner diagnosis: this method of procedure is the exact opposite to that followed by Goethe and Leonardo. This habit I call the method of looking inwards. René Descartes and Giordano Bruno will, as I think, answer our purpose: neither of the two is so nearly akin to Kant as to prevent dark shadows being thrown upon the picture from them upon him, and on the other hand, in respect of talent and feeling, these two great philosophers are just as fundamentally different from one another as Leonardo and Goethe. They have in common only—but this “only” means very much—the habit of the specific thinker. Bruno, the Goethe of our second pair of philosophers, exclaims, *Gli beni de la mente non altronde che dall' istessa mente rostra riportiamo*¹ (it is from the mind itself and from no other source that we acquire the riches of the mind),—and Descartes, the strict empiric, the Leonardo, says deliberately, *Il n'est aucune question plus importante à résoudre que celle de savoir ce que c'est que la connaissance humaine, et jusqu'où elle s'étend, . . . Rien ne me semble plus absurde que de discuter audacieusement sur les mystères de la nature sans*

*avoir une seule fois cherché si l'esprit humain peut atteindre jusque là.*²

These few words will have sufficed to show you with what manner of man we have to deal here; at the same time the patent relationship to Kant's objects and methods and convictions is at once striking. The investigation of the essence and of the limits of human knowledge describes exactly a great part—the critical part—of Kant's Life-work, and that the peculiar riches of the mind must be acquired from within and not from without, puts into a few words what Kant looked upon as his positive, practical, and edifying achievement. But even the points of difference will teach us much. The life-stories of the seigneur du Perron (Descartes) and of the man of Nola (Bruno) show conclusively that these two men as regards their intellectual talents are far removed from Kant. In the first lecture we saw how deeply rooted in Kant's method of perception and in his adoption of ideas was that peculiar feature which made him so painfully avoid even the shortest journey; Bruno and Descartes, on the contrary, move restlessly from place to place, and from country to country, as the spirit moves them. Bruno, with his apostle's nature, needs new contacts, new excitements, new disputations; he is bound to strike sparks out of life, to kindle flames in hearts; wherever he goes he arouses glowing love and irreconcilable hatred. Descartes, the reserved man of the world, travels in order to be alone, enjoys in cities "the solitude of the remotest deserts," steals away from a place as soon as his presence is noticed, and at the same time, by a systematic observation of the differently constituted men and nations, religions and customs, seeks to free himself from the prejudices which are rooted in us all. *Je ne fis autre chose que rouler ça et là dans le monde, tâchant d'y être spectateur plutôt qu'acteur en toutes les comédies qui s'y jouent.*³ Such a funda-

mentally different ordering of life points to far-reaching differences in the essence of the intellect: we may premise without going further that Bruno and Descartes "saw" otherwise than Kant did. This will be especially clear in the case of Bruno, who, in spite of the purely philosophical tendency of his intellect, is in many respects the veriest antipodes of Kant, and as such can render us valuable service, whereas in Descartes the close kinship leads us to penetrate the inmost secrets of Kant's method of perception, while allowing us to leave on one side the many points of difference between the two as having no value for the object which we have in view.

Among the very great thinkers of the world's history perhaps none has been so scurvily treated as Descartes; he,—I mean the true Descartes,—is as good as unknown; the shadowy being that under this name is represented to our imagination, is a mere ghost-like caricature. Here was a man who with desperate energy fought to purge himself and us of all philosophical phrases; whose burning endeavour it was to tear philosophy out of the toils of a logic as arrogant as it was impotent, and to open its eyes to the one and only productive authority of pure perception; a man who in open and indignant opposition to the schools cried out, "the whole sum of human science consists in seeing distinctly";—and of this man the vast majority of cultured people know neither the personality nor the life nor the achievements, with the exception of just one single saying which has been thrashed out until it has become a mere phrase—*cogito, ergo sum*,—a mere jingle of syllables, unless we knew how it originated in Descartes, and whither it led him. Just think how it would be if some future history should have nothing more to report of Bismarck than that his was the saying, "We Germans fear God, and nothing else in the world," as if this very disputable

phrase represented the sum-total of the achievements of his richly active life! Where is the difference, if we only take count of one ambiguous and much misunderstood saying of the pioneer in mathematics, the physicist, the anatomist, the kosmologist, the philosopher, of the man who perhaps more than any other has so enriched our treasure of constructive imagination that to this day philosophy and science are refreshed by the stimulants of his genius? But as though it were not enough that a philosophy resting upon the broadest foundation of an all-embracing, manifest consideration of nature, should have been to such an extent turned topsy-turvy by degradation into mere logical and psychological nut-cracking—beyond all this we are even robbed of the man's personality. Descartes was an aristocrat by birth,—by the bent of his intellect an extreme individualist. He does not only hold himself aloof from his fellow-men, choosing an abode in foreign parts, and leaving a town as soon as he becomes known and gets entangled in social relations,—but even intellectually he surrounds himself with a high wall lest the doctrines of the contemporary philosophical guilds should find their way in, and even for the time being digs a deep moat to keep the wisdom of the ancients at a respectful distance. To treat with scorn the nullities of the professional philosophers—*les bagatelles d'école*—is for him the distinguishing mark of a "princely character," and of himself he confesses, "not the understanding of the arguments of others, but personal investigation on my own account is what constitutes for me the greatest happiness of study." It is in a quite different sense from Schopenhauer that Descartes is a great Eremite; for in him there is none of the bitterness or vanity of solitude, it is a proud and peaceful self-contentment. It was only after long years that the incessant pressure of so respected a friend as Pater Mersenne determined him to publish, and it would have

remained at that fragmentary beginning, had not the request of an exalted friend, the Countess Palatine Elizabeth, stood in the light of a royal command to so perfect a man of the world. *Je ne recherche point les bonnes grâces de la populace*, he writes with quiet disdain in a private letter : but with him *populace* has a wide meaning ; for when Mersenne communicates to him the criticisms of the most learned men in Paris, he answers, " I have long known that there are asses in the world, but I set so little store by their judgment, that it would vex me to be obliged to spend upon it even a minute of my leisure and my peace." No more is needed to show that an investigator who so resolutely follows his own road, and avoids all contact with the officially recognised masters of scholastic thought, will not easily develop a system of philosophy fitted to be formulated into a strict scholastic shape. The picture of the world that Descartes unrolls before us, is no grafted scion such as we are used to see in philosophy, but a tree grown from the seed. Plato hangs upon Socrates, and also upon Pythagoras, Anaxagoras, Heraclitus, and others : Aristotle springs from Plato ; Bruno from Plotinus, Lucretius, Cusa ; Locke, Berkeley, Spinoza, Leibniz from our Descartes ; Kant, too, springs from Descartes, and from Leibniz, Locke, Rousseau, Hume ; and so it is with all of them ; Descartes alone stands by himself. And although he is convinced of the truth of his perceptions, hoping that their victory will result in a new birth of the sciences, still he keeps such jealous watch over his independence, he is so deeply concerned to be left even after his death inviolate in his proud isolation, that he starts by declaring that his method is for himself alone, not for others ; *mon dessein n'est pas d'enseigner la méthode que chacun doit suivre pour bien conduire sa raison, mais seulement de faire voir en quelle sorte j'ai tâché de conduire la mienne* ;—and so over and over again he does not shirk the paradox

that his philosophy is void of all originality, which he only admits openly in order that the good people may not fall into the idea of making his name the centre of a school. The idea was to him a scarecrow that there should come men who would imagine that they could in a day compass that of which he had realised the insight after twenty years of study and education, and that upon it they should build up a Philosophy fit to make one's hair stand on end, should delude themselves into the notion that this Philosophy was the result of his "Principles," and assure the world that he, Descartes, was its founder.⁴ It is touching to hear how he implores posterity,—“never believe that the things of which people are assuring you sum up my teaching, and originate in me: ascribe to me only that which you gather from my own mouth”—and his real wish, that is to say his wish in opposition to the founding of a school, he tells us clearly enough in the same passage, is *ouvrir quelques fenêtres*, not to build up a system, but to “tear open the windows and let in the light” for all those who have eyes to see. You can now distinguish broadly, what occupied this great intellect, and what must needs be his aim when he at last allowed himself to be talked over into appearing in public. Himself a free personality, who at the expense of great labour had torn from his eyes all the bandages which education, parentage, the wisdom of the schools, the doctrines of the Church, had bound round them—his aim is to educate free personalities, and with that object not to teach them,—in the sense that is to say of the schools,—but to lure them on, and to do for them as he had done for himself, namely, to open their eyes, and make them teach themselves by means of perception. By “philosophy” he understands literally the opening of the eyes, *oculos aperire*.⁵ And since this is the fundamental principle of Descartes' personality and teaching, so he

cares nothing for the fixed establishment of great, universal, irrefutable principles, but gives himself a free hand in the intimate description of his often quaint ideas which only fit in with his own personality. Only look at his portraits! look at his innocently amazed outlook over the world, and his slyly ironical smile at the wisdom of mankind! Why! the man is anti-scholastic to his finger-tips. Even the famous *cogito, ergo sum* ("I think, therefore I am") is no logical conclusion, at any rate for him, but the verbal expression, clothed accordingly in the rags of logic, for a definite perception: and when the professional schoolmen want to split hairs with him on the subject he winds up the argument by saying, "I do not argue the question of my being by a syllogism, but I perceive it."⁶

This was the man whose fate it was to become—beyond the grave—the sacrifice of the populace in a way no other thinker did. Hardly was the breath out of his body when the European world of learning became divided into two camps, the Cartesians and the anti-Cartesians. The proud Eye, so wise, so lovable in spite of all its distrust, was closed; and now it was to be anatomically dissected and lectured upon. The teaching of Descartes, "perfected"—as usual—by all manner of insignificant and contradictory minds, was transformed into a system of scholastic definitions and rigid dogmas. Descartes had said, "as for the search after definitions, we can leave that to Messieurs les Professeurs"; in very many cases definitions only serve to make dark what is clear; the professor with his subtle distinctions clouds the natural light of the understanding, and ends by making an obscure problem out of what every peasant knows. Descartes had been indefatigable in confining logic within the narrow bounds of its justified effectiveness, since, as he says, *l'art syllogistique ne sert en rien à la découverte de la vérité*; whereas the art of logic is a

chief instrument of the schoolmen for talking of things about which they themselves know nothing.⁷ A few years after his death there arose a complete logical system, the "Logique de Port Royal," which pretended to be founded on his teaching. A very short time elapsed and this so-called Cartesianism was in the very centre of the conflict over the Eucharist : Calvinists and Jansenists, the deniers and the champions of the Real Presence of the Body and Blood of Christ in the bread and wine, both appealed to Descartes : in his grave he was marked as the founder of the *philosophia eucharistica* ; his loftily plain writings, conspicuous for their frankness, were forced to serve, like the *arcana disciplina* of the ancient mysteries, as evidence for and against the most abstract cobwebs of the brain, and between whiles the Physicists dragged out the over-hurried hypothesis of a genius on the Gyration of the Kosmos, fighting for and against it, as if the Personality and nature-teaching of Descartes must stand or fall by it ; while Freethinkers and Pietists both took possession of the so-called automatism of beasts, out of which they drew opposite conclusions. For more than a century the world was filled with the roaring of the Cartesians and the bellowing of the anti-Cartesians ; of Descartes, the lonely investigator and thinker, there was no longer any talk. And when at last, in no small measure out of seed which he had sown, a new science and a new philosophy had gradually grown up and waxed strong, universal contempt washed away the barren Cartesianism and the equally barren anti-Cartesianism. The great personality of Descartes had long since faded away. Only the ill-starred *cogito, ergo sum* was bandied about like sea-wrack on the all-devouring ocean of the world's history.

True, Descartes receives honourable mention in the philosophical histories. Schopenhauer's dictum, "the Father of the Modern Philosophy," has been universally

repeated ; but it is always in the sense of what is called in stage language *un père noble*, an honoured but not much noticed person of distinction in the background. I can unhesitatingly recommend to you the first volume of Kuno Fischer's comprehensive work upon the modern philosophy : he gives at any rate a fairly exact biographical account of the man : but even here Descartes is so dealt with that he falls behind the other philosophers ; and although there is much material given for a representation of his personality, this very representation, the portrait of such a wholly individual intellect, the plastic bringing into evidence of his special significance, is a failure. In most of the other handbooks you will only find one chapter about him, entitled " Descartes and his school," or simply " Cartesianism." He who said, " the great intellects talk nonsense as soon as it is their disciples who speak for them, for it is perhaps outside all experience that any pupil should have equalled his master," that very man hardly exists any longer save in the title for a School ! Nay, more : when all is said and done, few of our professional philosophers are so equipped as to be capable of understanding the true Descartes ; for Descartes, as you will already have observed, is far more of a contemplator of nature than a philosopher in the scholastic and still authoritative meaning of the word : indeed we might frankly call him an anti-philosopher. For him philosophy,—this is his own literal definition—is a tree, " the golden tree of life " ; its metaphysical roots strike into the dark earth, and as Descartes humorously remarks, it is not upon roots that fruit usually grows ; the mighty stem is the science of physics, under which he comprehends the universal laws of all motion, and this stem branches off into the many empirical ramifications of knowledge, at the points of which flowers at last bloom, and the blessing of fruit ripens.⁸ You need only look at Descartes' chief systematic work, the

Principles of Philosophy. In Cousin's edition the first part, which contains all the psychological and metaphysical discussions, needs only 57 pages; the three remaining parts,—Physics, Kosmology, and Geognosis, upwards of 400 pages,—while Descartes apologises for not yet being able to publish his Zoology, Botany, and Anthropology. He indeed was the first to put the problem of perception in the foreground, a fact wittily put by Fontenelle in the remark that, *avant M. Descartes, on raisonnait plus commodément; les siècles passés sont bien heureux de ne pas avoir eu cet homme là*,⁶ and so he was the first man to awaken true metaphysical reflection; yet he himself spends but little time over it. It was the distinct perception of his own inner being that served him as the first step towards distinctness in the perception of visible Nature. In the same way he made use of metaphysics as an active help to physics. Anybody who is not competent to follow him in the domain of natural science and mathematics will find it difficult to do him justice. He studies the functions of his brain as a part of the world which directly concerns him, and is therefore of fundamental importance, certainly not in the sense of a professed philosopher in the ordinary modern meaning of the word, whose calling and business it is to think over all matters in the abstract. He has no faith in the professional philosophy: he characterises it as *une grande erreur*, and says, *il est plus facile d'apprendre toutes les sciences à la fois que d'en détacher une seule*. A man of this stamp is far removed from our philosophical professors, not only further than their own dearly beloved Spinoza, who never once leaves the domain of the abstract, but further even than a Francis Bacon, who, it is true, constructs a *Novum organum* for the dissemination of the knowledge of nature, without having ever himself been busied with mathematical and natural-scientific work, and whose first principle it is to

abandon all philosophy in favour of a so-called empiricism;¹⁰ further too than a Locke, or a Berkeley, or a Hume, or a Leibniz, for the chief element of the philosophy of all these men consists in *ratiocinatio*, that is to say, the pondering in Reason, and progress through pure conclusions of Reason. Here, on the contrary, we see a man whose chief work, unfortunately never finished and only known by fragments, was to carry the title of *Le Monde, ou Traité de la Lumière!* So it was the whole great world, the Kosmos as we should call it to-day, and in it first and foremost the medium by which it becomes known to us, namely Light,—that it was his aim “to observe, to investigate, to grasp,” and only the man who keeps this aim before his eyes can hope to gain a correct appreciation of the personality of Descartes, and of the gifts which it bestowed. If we lay a one-sided stress upon the intellectual and theoretical reflections of this man, together with his metaphysical discussions on mind and matter, and his attempts to set forth irrefutably the existence of God and the immortality of the soul,—then we shall not only obtain a crooked picture of him, but we shall at the same time not even be in a position rightly to grasp his peculiar method of looking upon these purely speculative questions. The man who does not study Descartes’ physics and does not penetrate their essence, sees his metaphysics in a false perspective; that accounts for the inadequateness of all the representations of Descartes in philosophical books.

But the same ill luck pursues him elsewhere; for he hardly fares better at the hands of the mathematicians, mechanicians, physicists, and anatomists than he does at those of the philosophers. Inasmuch as we are living under the domination of the extreme specialisation, every single branch of science only enquires after concrete services rendered within its own especial kingdom, and it is upon these that it reports, whereas Descartes’ peculiar

domain is the buffer-state. As between metaphysics and physics, so in all cases Descartes is happiest on the frontier. There where union and separation take place, where the coy facts are forced in the interests of combination with other series of facts to become supple and accommodating,—there where everything arises which we call “explaining” and “understanding”—there it is that Descartes at last feels himself at home. For that reason, and for that reason only, he devotes himself passionately to the study of mathematics, the great mediator between perception and thought, between things that are visible and thoughts that are invisible. But even mathematics, to the furtherance of which he rendered undying services, are to him “only the husk, not the essence”; to work at pure mathematics for mathematics’ sake he looks upon as aimless waste of time, and he hurries so that it is difficult to keep up with him through the technicalities of form and place, in order that he may come at once to Physics and mechanics; but here again it is not the detail of the phenomena which interests him, but the Essence of Light, the Causes of Gravitation, the relationship between the mechanical laws of Matter and the Facts of Life, and so forth. It is true that if he dissects a brain he will give an exact anatomical description of it,¹¹ but what grips him is the hope of discovering a visible connection between the morphological figure and the function of memory. This last example shows you with special clearness how in this peculiar man theoretical thought and the desire for concrete perception went hand in hand. It followed that Descartes, in the individual sciences, achieved less than might have been expected from a man of his genius. His theorising was detrimental to the freedom of his observation, while at the same time the freedom of his theorising was narrowed by the painstaking detail-work of his observations. Hence it is that even his undeniable

services in the domain of the exact sciences,—his informing thoughts as well as the discovery of facts,—reached their goal for the most part in other hands, not in his own, and therefore are assigned to other names. For example, there is documentary proof, though no notice is taken of it, that he taught the gravity of air and made experiments upon it, when Pascal was a boy and Galilei still maintained the *horror vacui* as an unassailable dogma,—as also that the famous experiment of the Puy de Dôme was only undertaken under pressure from the unbelieving Pascal;¹² that Descartes should have discovered the circulation of the blood independently of Harvey, and the laws of falling bodies independently of Galilei, are matters of which the specialists take no heed; but for the knowledge of his personality they are of the deepest interest; that he was the first to expound the mathematical laws of the refraction of light, was proved by Humboldt as far back as 1847, but I find no mention of the fact in any later work; in medical books you will find cursory mention of Descartes amongst the leading names under the words "Eye" and "Brain"—as you see mere fragments, mere insignificance, or—Nothing. That the perceptible idea of the inertia of matter lies at the bottom of our whole mechanical science, is a matter of common knowledge, but few know that we are indebted to Descartes for it, and there is not one who prefers to base his judgment of the nature of such a mind upon an intellectual feat like this and others, rather than upon the *cogito, ergo sum*.¹³ Just as little is it remembered that it was Descartes who paved the way for a revolution in Physics similar to that of Copernicus in astronomy, when he nourished the inspired conviction—which to his contemporaries was incomprehensible and seemed sheer madness;—Light is motion; and that moreover not the trajectory motion of a body violently flung, as Newton taught, but the motion of an imponderable

matter, the æther, by which our optic nerve is made to oscillate. Under the passive domination of the clumsy Newtonian ideas this thought was forgotten, and when, in order to justify the facts, it had to be taken up again, men preferred to attach themselves to Christian Huyghens—a son and grandson of two most intimate friends of Descartes,—who had grown up under the eyes of the great man, and who had further developed his inspired thoughts as to Æther and Light into the ultimate mathematically and fully developed theory of undulation. And so the constructive thoughts of Descartes are not only the basis of our atomistic physics, but also of our molecular physics. And in spite of all it is but little that we learn about him in the books on natural science, and here too his form remains clouded and distorted before our eyes.

I hope that I shall incur no displeasure for having shown you so circumstantially how far and why Descartes has seldom been honoured in accordance with his merits, and why his personality is perhaps never rightly judged. I had to introduce this negative method of dealing with the question, because I had it at heart to upset what you might possibly know about him, or rather that is to say, think you know, in order to make way for more correct views. In the meantime I hope that you will yet have learnt something, and feel yourselves nearer to the true Descartes than you did a while ago. And I set great importance upon your knowing exactly what were the views of this remarkable man's brain: for in my lectures this brain constitutes the turning-point of our observations of Kant's personality, just as he himself, in more than one respect, constitutes the turning-point of human thought in general. I purposely use the word Brain, not System, not Metaphysics, not Discoveries: the system of Descartes, that is to say, his Kosmology as it is developed in the *Principia* and elsewhere, is distasteful, that is to

say, distasteful if we examine it with painstaking accuracy like a dogmatic structure, without paying attention to the author's warning to read his systematic works as fast as possible, *comme une fable* or *ainsi qu'un roman*,¹⁴ his metaphysics, in spite of the fact that they are the point from which all later thought proceeds, are at once jejune and extravagant, without ideas and at the same time hyperphantastic; he never, with the single exception of the explanation of the rainbow,¹⁵ followed up and worked out his discoveries to the end in a satisfactory manner: at one moment he allows himself to be choked by empirical detail, in the next he soars into hypotheses which in the plethora of artificially interlaced distinctions of detail are but ill calculated to further the strict beeline of investigation. We will not dispute with him about that, but far rather learn to recognise with Vauvenargues the fact that Descartes has often seen right and guessed right, even where he was in too great a hurry to press forward in the combination of hypothetic causes; ordinary intellects have nothing to fear from such mistakes, *les esprits subalternes n'ont point d'erreur en leur privé nom, parce qu'ils sont incapables d'inventer, même en se trompant*.¹⁶ Descartes himself, in his wisdom, knew full well how that matter stood, and often gave expression to this appreciation in the words: "it is enough if I clear the road, you must do the rest"¹⁷—and therefore I say once more of him his work is of less importance than the Man himself, or, as I said before, the Brain. We men are a right foolish folk: here is the one philosopher of all others, in whom first and foremost personality in the very special character of its intellect, and only in the second place systematic doctrine, forms the driving power and the lasting interest, and yet it is in this very man that we have allowed personality to escape us! Still, in the after life of history certain men enjoy an inexpressible immortality: this Descartes possesses

almost more than any other man; for the thoughts which that brain thought, and even more than the thoughts, the way and manner in which that brain grasped the chief problems of existence,—what therefore we must call the Manner of Seeing, the manner of directing the Eyes outwards and inwards,—all this has so penetrated, impregnated, and informed our philosophy and our natural science, that all of us, no matter to what school we belong, are compelled to weave the warp and woof of our thoughts in the loom of Descartes. Rightly did Huxley, one of the few philosophically trained investigators of Nature of the nineteenth century, remark: "In all thoughts which are characteristically modern, whether in the domain of philosophy or in that of Natural Science, we find, if not always the form, still the spirit of the great Frenchman"; an acknowledgment for which one of the best authorities upon Descartes, Count Foucher de Careil, coined the epigram, *On se croit nouveau, on est Cartésien*.

It was first and foremost the whole attitude of the intellect, namely the unconditional enquiring, which made epoch. Descartes' intellectual attitude is sceptical,—but in the old meaning of the word. For the verb *skeptomai* originally meant to see, to contemplate, to investigate, later to ponder, to reflect upon. In the word sceptic in old days the stress was laid upon investigation and careful contemplation (Gellius called the sceptics *quæsitores et consideratores*). The instinctive wisdom of the language-forming powers united the perception by the senses with the necessity of exact careful investigation, but not with the meaning of doubt which disintegrates everything, which arose in the decadence of Greek thought, and impressed a new meaning upon the word *skepsis*. The barrenness of philosophical scepticism is by its narrowed sense confined to logical functions: it neither reaches outwards to

empirical Nature, nor does it reach inwards to confident self-consciousness; the outer Nature as well as the inner essence should have taught the sceptics that that which is a matter of fact does not necessarily hold its own before the logical Forum. The ancient scepticism arose out of shallow thinking, and led to frivolity, whereas the scepticism of Descartes, on the contrary, means an awakening of mankind out of the sleep of dogma to free, enquiring use of the eyes. Descartes did not doubt for doubting's sake, but, on the contrary, in order to help forward the discovery of a possible knowledge. *Non que j'imitasse les sceptiques, . . . au contraire tout mon dessein ne tendait qu'à m'assurer, et à rejeter la terre mouvante et le sable pour trouver le roc ou l'argile.* The old sceptics, however superior they might think themselves, remained snared in superstition up to their necks; while Descartes was in all earnest endeavouring *d'entreprendre d'ôter une bonne fois toutes les opinions que j'avais reçues jusques alors en ma créance.* Now if Descartes' doubts had contented themselves with leading us back to that perception which he used to clothe in the words *cogito, ergo sum*, or *dubito, ergo sum*, or *sum, cogito, sum cogitans*, and the rest, that of itself would have been something: Kant calls him on that account "a benefactor of the human Reason": but, in fact, this result of critical reflection simply means the solstice of the Cartesian method of thought: it constitutes the point where motion reverses its direction to cross over from the negative to the positive. The *cogito, ergo sum* is a perception on the boundary-line, just as with Kant, *das Ding an sich* ("the thing in itself") is a conception on the boundary line, and it is only fools who find a pleasure in running their heads against boundary stones of this sort. Descartes was no such fool. On this furthest boundary line, upon the "rock" of his search, he raised a church to the God without whom he could not live; to prove the existence

of God is always a thorny undertaking, for He stands beyond the boundary of Descartes: yet this God not very religiously felt by Descartes, who had been educated in a Jesuit school, is less pressed upon us as something proven than made plausible as a necessary assumption, and has the one advantage that he is a God of truth. Descartes needs Him only in the interests of truth, in order that what is should be true, and for no other purpose.¹⁸ And now the bold investigator addresses himself to constructive intellectual work! He turns his back upon that boundary stone,—in his church he only kneels now and again for short worship: on the other hand he enriches the world with thoughts which are so full of life and freshness by reason of their visibility, that they have defied all the storms of time, and he bestows upon it a wealth of perceptions, which shelter such an inexhaustible symbolical store of truth, that, while reminding us of the oldest traditions of our race, they point to times that are yet to come.

Pray do not believe that I am using the language of hyperbole: my words are to be taken literally. As examples I will cite a thought introduced by him into philosophy, and an idea introduced into natural science. Descartes' analytical reference of the united subjective and objective experience of man to the two conceptions *extension* and *thought* is an idea so simply perceptible that it never can cease working productively: to this day all philosophers fasten on to it. They may use different wool and weave different patterns, still they are weaving at Descartes' loom—as I said before—all of them. On the other hand, a conception like that of the imponderable matter filling the whole universe, the æther, is so rich in symbolical, thoughtful, creative power, that it is only now that, in the light of new discoveries, we are at last beginning to recognise its great fruitfulness.¹⁹

In his work on the immortality of man Herder remarks :
 " It is incredible how few special forms in the realm of thought and human activities appear when we put history to the test. There are far fewer Regents who govern the world of the sciences . . . than Monarchs who rule over countries." There you have, expressed in a short formula, the merit of Descartes. He is one of those incredibly few who produce special forms in the realm of thought—and here, since an exposition of the philosophy of Descartes would lead us too far, we must give up the enumeration of the special forms which he introduced : but what we must keep our keenest sight upon is the way in which this man, receptively and creatively, looked out upon the world, the way in which he came upon " the special forms in the realm of thought." Let us now apply ourselves to this task.

I just now praised the great perceptibility in Descartes' thoughts ; at the same time I cited as an example his theory of the æther, an imaginary thing, which when we consider it more nearly defies all perceptibility. An exact analysis will convince us that, as a matter of fact, there are two ways of showing this expression of intellectual satisfaction which in ordinary life we describe as perceptible clearness ; we are partly dealing with what is seen, partly with what is thought. The creative power of the informing faculty of sight, directed upon the surrounding universe, was in Descartes of such rare might, that a matter-of-fact contemporary, the great mathematician Christian Huyghens, on receiving the news of his death, exclaimed :

*Nature ! prends le deuil, viens plaindre la première
 Le grand Descartes, et montre ton désespoir ;
 Quand il perdit le jour, tu perdis la lumière,
 Ce n'est qu'à ce flambeau que nous l'avons pu voir.²⁰*

As verses these are not worth much : but coming from the pen of a Huyghens, they have more significance

inasmuch as this investigator belonged to the exactest of the exact. And as you hear, he maintains that the sunlit world was dark and unseen until Descartes lighted a torch over it, the torch of thought. We men see nature all blurred, until clear comprehensions have reduced the chaos of perceptions to order. Our eye sees but dimly, until the thinking brain has fixed it sharply, like an optician's glass, upon the objects in view. In another stanza of the same poem Huyghens makes use of a trope which by the direct opposite completes what he has just said ; for he says of Descartes that he

Faisait voir aux esprits ce qui se cache aux yeux.

This implies that Descartes gave visibility to those things which our physical eyes indeed do not see, but which our understanding is compelled to think. And so as in the one case he bestowed thought upon things, so in the other he conferred upon thoughts the representations of the senses : in other words he gave them substance. In the one case it was the turning into thought that which had been indistinctly seen, in the other the turning into something visually perceived an idea which had been indistinctly thought.

We will at once illustrate these two sayings of Huyghens by examples. Descartes comes to the help of perception when he e.g. explains all the movements of bodies in heaven and on earth by the setting up of certain fundamental conceptions such as inertia, mass, and others ; even these simplest phenomena we never knew how to observe aright and see aright before the discovery of such ruling conceptions. To such as these belongs his theory that the Sum of Motion in the universe is once for all immutable, a favourite assertion of Descartes which, for the first time, brings into the chaotic oscillation backwards and forwards and circuitously in the Kosmos, a thought reducing it to order,—a thought which, merely

amplified by an additional sentence, is the foundation of the modern doctrine of the maintenance of energy, which is at the bottom of our whole science of physics.²¹ That will suffice for one of Huyghens' affirmations : now for the other. Descartes comes to the assistance of thought through perceptibility, when for example he starts the theory of the above-named æther. This thought-picture leads us on to look upon Light as the movement of an endlessly refined, imponderable, imperceptible matter, which fills the whole world, a movement which the optic nerve betrays to us, without showing it, since, of course, æther is not a thing perceptible and therefore real, but a symbol for something which is presupposed in thought, and undefinable.²² Another example would be Descartes' doctrine that it is not the Eye but the Brain that sees ; all impressions of the senses are in the last instance invisible motions of imperceptible infinitesimal particles inside the Brain.²³ Here, in the case of the hypothetical æther, and in the hypothetical molecular motions of the substance of the brain, the visibility which has been acquired in what are matters of mere thought serves to a consequential observation and concatenation of phenomena ; true exact science of nature and of mankind first became possible by means of this and similar symbols.

Here you have obviously two different intellectual gifts with which our philosopher is accredited, gifts which do not necessarily belong to one another, and both of which, if we see them as purely and absolutely developed as they are here, at once fascinate us as something not easy of comprehension. Descartes knew how to give intelligible form to that which he saw, and at the same time possessed the power of transforming that which was only thought into something visible : that is the fact to which Huyghens calls our attention. And here in very deed he goes straight to the core of the matter,

and for that reason his remark must serve us as a clue to the further analysis of this unique intellect.

In order swiftly and surely to plumb the depths, I should wish to take the judgment of Huyghens which I have already traced back to its simplest meaning and reduce it to a still more striking, concise, and purposely paradoxical formula. For it is not formulæ but phrases which are a hindrance to vivid insight, whereas a true formula serves as a skeleton round which the organs of the living figure by degrees arrange themselves. My formula runs thus:—Descartes' distinguishing gift was to make the visible invisible, and the invisible visible.

If you look around you in the world of your own contemplative consciousness, you will soon observe that the degree of perceptibility of the ideas which fill it is exceedingly various, and the same holds good of the possibility of conceiving them. And you will soon be aware that there exists here a very complicated interchange of displacements, a mutual give and take. We possess thoughts with hardly a shadow of a perception, and we possess perceptions which are attended only by just such a minimum of thought as is necessary for us to be conscious of those perceptions. Our daily life is made up in that way. Without venturing further I will only call your attention to one thing, and that is that a thought that is accompanied by a blurred, hardly realisable perception, therefore an "invisible" thought, can achieve but little, and that on the contrary pure perception soon grows into something monstrous, intractable, inflexible, unless thought takes the pains to seize upon it and convert it into something unseen. We are in no way embarrassed to find concrete examples, we need only think of our two first lectures: It was by a thought and in the interests of a thought that Goethe brought together the whole incalculable mass of animal and vegetable forms into his idea of metamorphosis: and so he breathed

the artist's soul into what was a mere brutal observation, furthering the investigation of Nature for all time; Helmholtz, the physicist, rightly taught us that the powers with which mathematical science deals cannot be "objects of the perception of the senses," but only "objects of the comprehending understanding"; yet Helmholtz, in his work on optics, has none the less to take refuge in plain diagrams, first the wet thread, then the ray, which like the sailor swarming up a rope, "produces itself along the particles of æther," and so he goes on from diagram to diagram because this thought of the "comprehending understanding" could not be realised and appreciated without a perceptible representation. This is the way in which we human beings, half unconsciously, are for ever changing the visible into the invisible—in order to see it better,—and the invisible into the visible,—in order to think it better. Kant, from his metaphysical eminence, has summed up what I am here only concerned to show in a concrete and visible shape into the following pithy sentence: "thoughts without contents are empty; perceptions without comprehensions are blind. Hence it is just as necessary to make our comprehensions perceptible to the senses, as it is to make our perception intelligible, that is to say, to bring it into subjection to comprehensions." Kant is here speaking of the common, unconsciously proceeding, necessary functions of all human reason from the moment that it enters into activity in the new-born babe: allow this reason to ripen to such an extent that it desires to build up for itself a science and a philosophy, and you will find this reason standing as conscious intelligence exactly where at its first awakening it stood unconscious. Then it begins to take matters easily; it seems so natural not to follow Kant's warning, but to be busy with empty thoughts and blind perceptions, that three-fourths of all philosophy from the earliest times to the present day

has never busied itself with other things. The writings of St. Thomas Aquinas, for instance, are an inexhaustible arsenal of ideas, which are incapable of exciting the smallest thought—mere “blind perceptions”; and if you skip from the thirteenth to the nineteenth century, you will find that the most popular of all the more modern systems, that of Schopenhauer, takes as its foundation-stone a thought which is, according to Kant, utterly empty, the one which it calls Will and which, according to its definition, is the opposite of an idea and consequently contains nothing capable of being in any way perceptibly understood. All such thought-structures are extravagance, not knowledge: Kant once formulated this very simply. “By mere perception without comprehension the object is certainly given, but not thought; by comprehension without corresponding perception it is thought, but none is given: in neither case, therefore, does any recognition take place.” How, on the other hand, perception and thought, the visible and invisible, go hand in hand towards the building up of systems of philosophy which explain nature, you may best see from the histories of our natural sciences, the development of which was conditioned by this mutual penetration. Let us here pause for reflection.

Think of how, at the beginning of the seventeenth century, Copernicus and Kepler are unravelling in its main features the course of the planets round the sun; from the leaning tower of Pisa Galilei makes minute observations of the fall of bodies,—instead of merely reasoning logically upon it as all his predecessors had done,—and pursues his studies upon inclined planes; Descartes and others with keen intellect and patience follow up the mysterious course of the Light-ray, its curves, its refraction, its reflection; Gilbert publishes his observations on magnetism . . . from all sides there comes in a stream of additional matter,—that is to say, material of observation, and in

every single sphere the empirical investigators are at work trying to the best of their ability, as Kant demands, to make their perceptions intelligible, that is to subject them to comprehension. Yet here we discover something over which we need not for the moment break our heads, but which we will simply accept as experience; namely that thought cannot directly fasten upon the perception of the senses, but must first with that intent create its own mental perception,—that which we call Symbol when we are wishing rather to bring to the front the perceptible side, Hypothesis when we are dealing with the mental side. Thought must create unity: this is its special function: pure perception only gives a kaleidoscope of special cases. Therefore perceptible thought cannot proceed without Symbol; it cannot, without further help, grasp, comprehend, and absorb the material of perception: without Symbol it remains empty. I can have no thoughts about the courses of the constellations, about the fall of bodies, or about the essence of Light, unless I also possess, besides the empirical material, and for its amplification, a symbolical representation of what takes place in that connection,—in other words something intermediate between perception and thought. And here my intellect makes a further claim. Not only must phenomena, within the individual series of phenomena be joined together by means of symbols, but all the separate series of phenomena with which I have become acquainted by means of empirical perception, must in addition be capable of being understood as one single comprehensive unity. For as Kant will teach you later on, that which we call Nature is “the unity of the multitude of phenomena,” as it is set forth as a matter of subjective necessity by our thoughts. It is impossible for me to realise a number of natures. The grouping of the planets round the sun, the grouping of the steel filings round the pole of a magnet on my desk must be

taken as energies inside one symmetrical Whole. And here the great Descartes steps in as a creative power: he produces a new "special form in the sphere of thought," he changes into visibility that invisible something which our understanding insists upon though it cannot perceive it,—he fills thought with contents: this he is able to do in that he sets up the perceptible hypothesis of a medium filling space, of a matter absolutely refined, invisible, imponderable, fluidly moving—the æther, a symbol, the child of his phantasy.²⁴ At once all the phenomena mentioned enter the domain of demonstrability and so become accessible to the constructive labours of thought: the æther carries and urges the stars in their courses, the æther as a driving mass becomes the foundation of the phenomena of gravitation, one set of movements of the æther gives birth to what we call the warming of bodies, another set to light, others to electricity and magnetism, and so forth. I refer you to my former lecture and am confident that this one example will show you with extraordinary clearness what is meant by "making visible the invisible." At the same time you will learn how indispensable perception is to thought, even to the possibility of thought. Descartes had indeed by his hypothesis poured out such a wealth of visibility over the secrets of Nature, while he

Faisait voir aux esprits ce qui se cache aux yeux,

that the eyes of men were dazzled by it. In those days neither the collected empirical material was sufficient, nor was thought adequately trained and refined to be fit for so grandly simple a symbol for all the physical phenomena of movement of the Kosmos. Besides this Descartes in the closer elaboration of the matter had fallen into an error for which he was reproved by Goethe; "he attacks the insoluble problems with a certain hurry, and for the most part enters the subject from the side of

the most complicated phenomena."²⁵ There is much that is artificial and arbitrary in the use which he makes of the conception of the æther. The startling simplicity of the general conception is marred by all sorts of hazardous amplifications in detail. But it is just here, as is the case with every important man, that we learn how far greatness and limitation are set side by side, conditional and conditioned. And so it soon came about that Newton with his keen intellect, at once exact and barren of all imagination, once more seized upon the scholastic fictions of forces working at a distance, and took the old conception of Light as a special Matter: Newton's ideas are in the same relation to Descartes' ideas, as those of a child to those of a man; and yet they corresponded exactly to the requirements of empirical investigation in those days. At the present time, when new matter has been accumulated by the work of centuries, we are gradually going back to Descartes and his symbolical method of thought: in the case of the understanding of Light this took place about a hundred years ago with the introduction of the undulation theory mentioned in the last lecture; in the case of the electric magnetic phenomena about half a century ago; physical experiments to explain gravitation as conditioned by the movement of æther, exactly as Descartes postulated, are the order of the day,²⁶ and the great Hertz, so early torn from the world, was possessed in death by the dream of reducing "the putative working of the distant forces to conditions of motion in a medium filling space."²⁷ Lord Kelvin—and following him many modern physicists, go still further and contend that the various atoms which chemistry admits are only different gyratory motions of the one and only æther: that there must therefore be no such thing as Matter, but Æther only: in this most exact method of investigation the "Thing" fades away, the Symbol alone remains. In a symbol so solidly

perspicuous is contained the principle of robust vital power.

So much for the explanation of the transformation of the invisible into the visible. "Perceptions without conceptions are blind," says Kant. Even as I could not budge an inch in the realm of thought unless I possessed a "reasoned" perception, so I must remain helplessly stuck in the quagmire of perception, unless I should have thoughts to drag me, as horses drag the cart, out of my difficulties. So be it. But how am I to obtain conceptions for my perceptions? Here again an intermediary something is necessary. Perception cannot directly become conception; the intermediary image is the Scheme. We men are incapable of taking into our inner consciousness anything seen or in any way perceived by the senses, unless we have previously in our thoughts reduced it to a Scheme. This is an aptitude which differs greatly in different individuals; yet if a man were altogether unable to generalise, that is to reduce the many perceptions to few schemes, it would certainly be impossible for him to think; for, as Kant hits the point by saying, his perceptions would be blind; he would see, but not recognise. In the last lecture we saw how the great painters schematise: a purely perceptible scheme is still sufficient for their object; only a minimum of conception enters into it. In a somewhat different fashion, but in obedience to precisely the same universal law of human reason, science goes to work. Whereas the painter wishes to see yet more clearly that which is already seen, and calls to his aid conceptions for that sole purpose, the investigator of nature wishes to conceive more clearly that which is seen, and to transform it into something known. When in this process of perceptible reasoning it is that which is perceptible which is preponderant, we speak of a Scheme; when, on the other hand, it is the element of thought which preponderates, wa

1 speak of a Theory. Theory and scheme belong to one another as Hypothesis and Symbol. Now we know exactly with what we have to deal ; in order to obtain a concrete example, we must return once more to the seventeenth century.

This time we must work within narrower limits ; we will only take into consideration the works upon the visible movements of perceptible Bodies : for we shall busy ourselves not with hypotheses but with seen facts. Let us then confine our thoughts to the way in which some men in those days busied themselves with the observation of the movements of the heavenly bodies, and how others,—the immortal Galilei in the forefront, instituted eager experiments on the movements of bodies on our earth, that is to say, on the fall, the impetus, the rolling off upon inclined planes, upon the trajectory of projectiles, upon the communication of motion from one body to another, and many other similar matters. The physical acceptations of the ancients proved themselves to be utterly false : new, accurately observed facts accumulated. How to order them ? How to “ make the perceptions intelligible ” ? How make what took place on earth consistent with what took place in Heaven ? the fall of the apple from the tree with the circuit of the moon round the earth ? Exactly as man had before, by submitting to thought the perceptible idea of the æther, come to the assistance of thought, so he had to act now in order to make his perceptions visible and capable of being surveyed : he had to remove the cataract from his eye, and that could only be by means of comprehensions, by referring all the single conditions of motion to a scheme which should be in accordance with rule, artificially thought out, and capable of being grasped logically ; not given to him by the empirical observation of Nature, but set up autocratically between the eye and Nature by the King in

his Castle of whom I spoke in the first lecture. Here again it was Descartes who laid down the principles of our modern theory of motion, and at the same time of our whole science of mechanics.

All movements of visible bodies may, as a matter of common knowledge, be referred to three fundamental laws, which we usually call after Newton, because he was the first to crystallise them in words, and has developed them in all their sequence.²⁸ But the third of these, which is not to be found in Descartes, is by universal consent recognised as a formal amplification of the first,²⁹ and even so very disputable.³⁰ We have to deal therefore with two, not three, fundamental laws, and these two laws were not thought out by Newton but by Descartes; Newton took them over almost literally from Descartes, though the latter had not worked them up to such perfect refinement.³¹ All that the so-called "first Law" of Newton contains—that Rest and Motion are not opposites, but only conditions of a body,—that every body left to itself remains perpetually in its own condition whether of Rest or of Motion,—that the body which is set in motion, unless there be some hindrance, will continue to move in a straight line with unaltered speed for all time,—all this stands word for word in Descartes. And I must call your attention to this, that no single one of the thoughts uttered in this law is the result of observation, or even capable of proof by experiment.³² The second law of Newton too, which treats of the mensuration and direction of the Motion which is communicated by one body to another, is contained without a single omission in Descartes. It is he then, and no other, who perfected this creative work of thought. But here again, as in the case of the æther, Descartes overshot the mark, and like Dürer in his doctrine of proportion, introduced superfluous, and even in the end false, matter, so that the sure tact of a Newton

was sadly needed to purify the core from the slag. But the only thing that is of interest to us here, is the fact that Descartes, by the introduction of a few schematically theoretical conceptions, contrived to unravel and so make available for mental elaboration that which winds itself round our senses from childhood,—that in connection with which the whole united antiquity never achieved clear ideas,—that which the great calculators and experimenters of the fifteenth and sixteenth centuries failed to set free from the entanglements of the whole material of perception; I mean the Phenomena of visible motion. Here again as you see is a “new form in the realm of thought.” And here as in the former case the value of such a creation for science and philosophy is immeasurable. For just as the symbolical hypothesis of æther paved the roads for thought upon which it was now possible to arrive at a rational appreciation of the phenomena of light, of electricity, etc., by means of a visible representation, so in this case the setting up of a schematic theory of Motion based upon metaphysical conceptions allows us to range the over-rich mass of facts seen into a few schemes of thought, where they can be guarded inclosed in formulæ. For there is the turning-point: since the Visible is as fully as possible,—in some lucky cases altogether,—transferred into the realm of the Unseen, of that which is as yet only thought, it possesses a handiness, a pliability, a movability, which otherwise are foreign to its own perceptions,—purely as such—and are dull, inert, awkward: they are, just as Kant taught us, blind, and grope about in the dark; but as soon as the human understanding has arranged them into comprehensible Schemes then it does with them as seems good to it, dissects a Whole into Parts, unites Parts at will, in short behaves as it chooses: it is Lord in its Castle.

We have now, as I believe, made an important advance in the understanding of the universal relations between

thinking and seeing,—which collaborate in so peculiar and twofold a combination for the building up of a system of philosophy,—as well as in respect of the recognition of Descartes' special aptitude for acting as intermediary between them. Our formula that Descartes' distinguishing gift was to make the visible invisible and the invisible visible, is no longer a formula, but an Insight. But I cannot let the matter rest there. Kant's thinking is a pinnacle of the human intellect; no man can reach him who shirks the trouble of climbing. It is therefore indispensably necessary that you should yourselves now enter upon the region which lies between perceptive seeing (or the sensitive faculty) and the understanding, which binds together comprehensions: otherwise you will only be possessed of partial, not complete, distinctness.

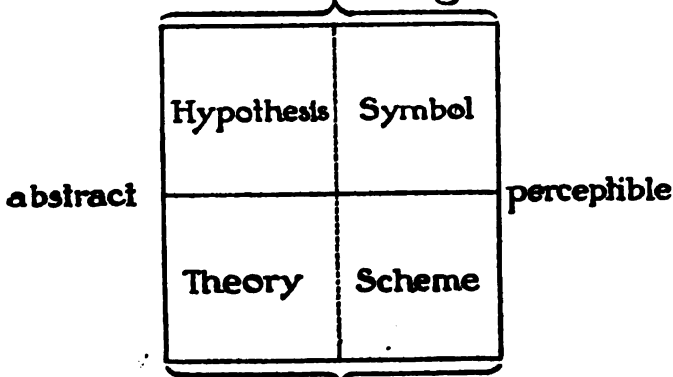
Let me, however, in a parenthesis introduce a short remark upon the subject of Symbol, Scheme, Hypothesis, and Theory. It is not a question of mere terminological clearness, but of a visible representation, which will also be useful to you philosophically.

The Symbol, in fullest acceptation of the word, is the perceptive demonstration of that which is thought: the Scheme, in its widest sense, is the rendering into thought of that which has been perceived: the Symbol furnishes thought with a thinkable perception; the Scheme furnishes perception with a visible thought. Within the symbol, however, it is possible to distinguish between a more purely perceptible and a more mental conception of the demonstration: the result of the first is the true Symbol, that of the second is the Hypothesis. In the same way the Scheme splits up into true Scheme and Theory. From this I draw the following explanatory diagram.

The advantage of this diagram is that it accurately describes the mutual relationships of these different

conceptions—that is to say, if I may so express myself, their mutual position in the Space of Thought. You see at a glance that if, on the one hand, Symbol and Hypothesis are related, on the other the relationship is between Scheme and Theory, while Hypothesis and Theory, Symbol and Scheme in the same way lie close to one another. A very slight mental impulse suffices to turn a Symbol into a Hypothesis, and a Theory into a Scheme; it is a sort of swinging of the pendulum that our intellect

The rendering perceptible
that which is thought



The rendering thinkable
that which is perceived

is carrying on the livelong day without paying attention to it. But even the boundary between Symbol and Scheme, as between Hypothesis and Theory, is not insuperable: a small change in the standpoint suffices to give a colour of Scheme to Symbol, and a colour of Symbol to Scheme, and in the sciences Hypotheses have a way of quite quietly, according to seniority, slipping into Theories. On the other hand, as regards the two pairs which stand crosswise to one another, Symbol and Theory, Hypothesis and Scheme, it is a matter of impossi-

bility for them to be changed into one another. But what cannot occur directly may sometimes be effected indirectly, and so it often happens in the Natural Sciences that a Hypothesis by degrees acquires the value of a Symbol, becomes schematised, and at last stands in all the dignity of a Theory. In the course of time that which is really only thought, and as such in a slight degree hypothesised, has managed to assume the character of perceptibility to such a degree, that it is conceived as practical perception, and is then converted into thought, so that it takes the shape of a Scheme, and in the end of a full-grown Theory. With the æther, for example, it is always the case, until often some new discovery suddenly reminds us that this idea only possesses a symbolically hypothetical value ; that is the way in which we men befool ourselves without any suspicion that we are doing so. The inverted process from Theory over Scheme, and Symbol over Hypothesis, which hardly occurs in science, is, on that account, common in everyday life. That which is seen is converted into thought by Science, but the layman comprehends scientific schematic thought as true perception : indeed, we have heard a Helmholtz talking of particles of æther " along which " a Ray moves !

This, however, is only a side issue. You must draw from it the one distinction between thinking and perceiving which is perpetually being forced to and fro in our brains. Perhaps in addition to that the small artificial Scheme may render us good service.

And now let us go back to Descartes.

From the two examples that we have taken, æther and the laws of motion, you will perhaps already have begun to suspect that thought and perception are not merely transiently, but really and permanently divided from one another. A complete fusion between them never takes place. There is never so much as an attempt at

such a fusion. The world, as we perceive it by our senses, does not satisfy thought, and never has satisfied it : for the world is incapable of thought, only our brain is that : and so thought creates for itself a Kosmos of its own, a special perception "converted into thought," and discovers at one time the Atoms, at another the Æther which the modern science of physics designates simply as "unperceivable matter and invisible motion."³³ And yet thought does perceive the unperceivable because it wills to do so ; and thought sees the invisible because in no other way could it build a bridge by which to attain perception, or make a road by which to reach the dreams and works of Reason. We may grant that this æther, this atom, is something perceptible, indeed it is seen with all the special intensity of a dream-picture, and it is only thanks to this vision that thought can climb aloft. In spite of this the æther, like the Atom, is sicklied o'er with the pale cast of thought, and—again like a dream-picture, as we advance they retire and ever elude our grasp : they are indeed not perceptions of the senses, but perception that is *thought* : a symbol is not a thing : the man who seeks to investigate æther and atom by perception, is tilting against something that does not exist. The analogy holds good with our perception. The schemes upon which we base our experiences in the matter of the movement of bodies have for their aim the transferring of these perceptions into the domain of the comprehensible : here it is, and nowhere else, that thought like a mighty tree must carry and nourish the monstrous rootless liane of empiricism that is "conscious of no bounds." In this case our aim is to convert what we have seen into a quantity, that is to say into something so far only thought ; colour becomes a quantity of oscillation, and a man born blind can talk as much wisdom about it as a Titian.

But should you not yet be convinced that it is the

intimate laws of the human intellect, the fundamental facts of metaphysics, that are the informing power that is at work here,—should you imagine that without calling to your help metaphysical discussions you can arrive at clear notions about Time and Space, and about Motion in space and time, I will instead of laying before you arguments for which you are not yet prepared, address one request to you: I would ask you to refer to the scholion on the eighth definition in Newton's mathematical principles of natural science. It is the man of distinctly anti-metaphysical principles who is talking to you, and that indeed in a work of imperishable importance. In the beginning of the passage in question he declares with disconcerting guilelessness—"Time, Space, Place, and Motion, as matters of common knowledge, I do not explain."³⁴ If the question were merely one of dealing with the simple perception of these things, then an explanation of time and space would be as little necessary for the greatest intellect as for the most narrow-minded cow-herd. It seems to me that this postulate was altogether insensate: that which is self-evident cannot gain in value by explanation: on the contrary, it is out of the life that the word comes. Descartes' warning is: *il faut mettre au nombre des principales erreurs qui peuvent être commises dans les sciences l'opinion de ceux qui veulent définir ce qu'on ne peut que concevoir*. But there is no question of time and space, as they are known to all,—Newton himself will presently teach you that this would not lead us one step further in Science,—but with that intent it is our business to transfer that which is seen into that which is thought, and vice versa, and so we arrive at inextricable confusion until a critique of human Reason has illuminated us. Read a little further in Newton's scholion. You will find there things about "absolute space" (*spatium absolutum*) which are not less edifying than the properties of the *absolutum quid* of

the schoolmen. This "absolute space is without relation to any outward object" (*sine relatione ad externum quodvis*); but there would be little to be made of a thing which stands in no relation to anything; therefore, in addition to this absolute space, relative spaces are assumed (in quantity), and these relative spaces are movable in absolute space of which they constitute the parts! I do not think that the human intellect has ever attempted to imagine anything so monstrous as this quantity of spaces, which move about in confusion. It is true that these movements are only a passing idea such as might appeal to the intellect of our aforesaid cow-herd, for immediately afterwards Newton gives utterance to this deep reflection: "if the parts of space are turned out of their place they are, so to speak, removed from themselves"; but even that will not do, and so we receive the amplifying assertion about these relative spaces—"the spaces are their own places" (*spatia sunt sui ipsorum loca*). And when you are stuck fast in this utterly senseless empirical jumble, you are taught that this space (of which you were told on the previous page that it is such a matter of common knowledge that it needs no explanation),—is beyond your ken, and that "you are not able to separate its parts by means of your senses"; and therefore, and here comes the gem of the whole, since you are dealing with something not perceptible to the senses, something impossible of distinction, therefore, *quoniam*, you must assume perceptible mensurations (*mensuras sensibiles*). So with perception you are to reach the invisible, and to measure something the parts of which you are not able to distinguish! The cause of this confusion which could only be cleared up by the highest critical circumspection and the finest analysis, lies in this, that mankind is not possessed of a clear appreciation of its own intellect: we interchange the Scheme which is only capable of being thought with the

true perception of the senses. There in the case of æther (just think of the theory of undulation and its powerlessness in respect of colour) that which pertains to thought intruded into perception with disastrous results ; or perhaps it would be more correct to say,—since the æther is, as you will remember, a thought converted into perception—the human intellect proved incapable of producing out of its own powers a symbol which should equal Nature : here, in the fundamental conceptions of dynamics as developed by Newton, the same intellect proves incapable of freely discovering thoughts in all portions, that is to say, of converting into thoughts its perceptions by the senses. In order to bring our perceptions under a few fundamental conceptions we invented the law of *inertia* : but the thoughts of absolute space, endless time, the uniformity of a body, which according to definition should be alone, and so removed from all comparison,—all this is not known to us by perception. From empirical perception we borrow that minimum of perceptions of the senses without which our theoretical thoughts would be empty, that minimum without which the scheme could not be fashioned : but true perception never exactly tallies with this theoretical schematisation. And so we come to a standstill as soon as we in all too great simplicity attempt to satisfy the human intellect without a metaphysical critique, although in practice all goes well enough, and a Newton erects a building worthy of everlasting admiration when once we grant him a certain series of premisses as unthinkable as they are imperceptible.³⁶

You see from these considerations how important it is accurately to investigate the critical domain between perception and thought, and also how many difficulties throw us into confusion by piling themselves up against our understanding. Happily there is one function of our intellect, one, only one, mathematics, which allows us to

clear up this matter to perfect distinctness. One general explanation, and then I propose to start upon a discussion of Descartes' relationship to mathematics: in this way we shall by degrees reach daylight, and we shall have no difficulty in seeing how all this may be applied to the study of Kant.

I propose here to insert a diagram which will serve as a pause, and give my words a really comprehensible meaning. If we express the range of the human intellect by a quadrangle,—a circle would be better, and a globe of course still better—we can in general terms affirm that one half belongs to the senses, that is to say, to perception, to that which is perceived, the other to the understanding, thought, the formation of comprehensions; those are the "two quite heterogeneous portions" of which Kant spoke a while ago. A more minute consideration, however, such as that which the history of our natural sciences has forced upon us, will soon convince us that pure perception and pure thought are not directly in contact, but that there is an intermediate domain which serves to help the crossing over of the one to the other. There are certainly no fixed boundaries; we are not dealing with a machine the wheels of which simply lay hold upon one another, but with a living structure in which every single organ in combination with all the other organs forms a unity at once real and ideal. Whereas in a watch the parts come first, and it is only in the end that the watch as a whole comes into existence by the combination of the parts,—in a living body the Being itself is the first, and that which we are pleased to distinguish as parts or organs, is formed by degrees and has never more than a conditional importance in regard to the Being, since the division of the functions does not take place, as in the watch, according to an immutable stencilled pattern, but one organ can even take up the duties of another. Still a Scheme will serve our present

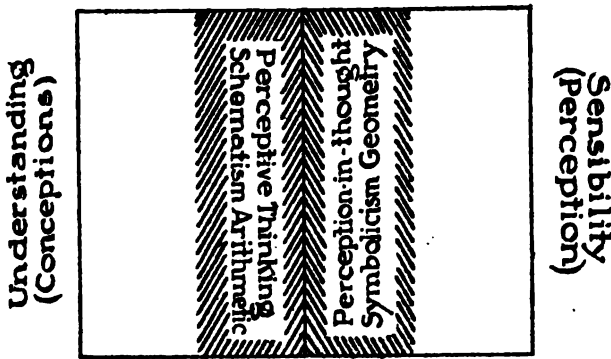
purpose, and a Scheme is only clear when it is schematic, that is to say, absolutely quadrangular and rectilinear. So we will draw our quadrangle and assign one half to the Senses (the *Sinnlichkeit* of Kant) and with them to Perception,—the other half to the Understanding (as Kant calls it) with its conceptive Thought. But, towards the middle, pure conceptive thought crosses over to perceptible thought, and in the same way, towards the middle, pure perception of the senses crosses over into thoughtfulness. This boundary land I will denote by hatchings.

You have already seen how the understanding strove to annex into its own domain the visually seen perceptions in regard to Motion, and how with this intent it drew them over, not without violence, by the help of Schemes to its own special boundary land of perceptible thought; and before that you had seen how the senses had succeeded in awakening to a glorious life scientific thoughts which had up to then remained unfruitful, and when well considered generally unthinkable, by the means of the discovery of a sensible and perfectly perceptible Symbol, the æther.

The slightest reflection will surely suffice to show you what a travelling backwards and forwards goes on within the human intellect. If, for instance, in our laws of Motion stress should be laid only upon the theoretical and arithmetical, which was the case with Newton the juggler in figures, then these laws end by losing all perceptibility, they leave our middle line for the boundary of the hatched part, they become altogether thoughts: but with Descartes in these very same laws of motion it was the conception of the senses which prevailed, and more recently with Hertz in the same way the geometrically perceptible: by those means the thought shifts towards the middle line, that is to say, towards the Symbol, and Theory becomes relatively more schematic

than theoretic. The same thing takes place with our thoughtful perceptions. They may belong so entirely to the senses, that is to say, they may stand so entirely on the edge of this hatched region, so far therefore from the half assigned to the understanding, that comprehension is not in a position to grasp them. Goethe's metamorphosis is an example of that. Descartes' æther, on the contrary, belongs in an important degree more to the realm of thought, in spite of being still quite concrete. The symbol of the æther can be drawn into itself from

The Middle Domain



the conceptive portion of our being with such violence that, as you have seen, in the end every concrete conception fades away, and æther subtilises itself into a motion as yet only imagined, dispensing with every perceptible, material foundation (see page 130). In this case then not only is the middle line crossed, and the Symbol turned into Scheme, but this Scheme itself is as yet little more than Thought. I commend to your understanding the Physics of Lord Armstrong and the "Primitive animal" (*Urtier*) of Goethe as the two most remote and most opposite ends of our "buffer state." In the one case a conception (the movement of the No-Thing in

empty space) which wipes out all conceptibility down to the uttermost remnant, so that it is impossible to think of it any more ; in the other case a thought (the original creator of all individuals, itself without any individuality) has so completely materialised itself that there remains not even that minimum of conceptibility without which no form can be clearly recognised.

From this schematisation and this warning against the misuse of the Scheme, let us now turn to Mathematics.

The characteristic of the science of Mathematics is that it takes possession of the "buffer state," the hatched part of my diagram, and exactly fills it. Here is a case where no scheme can be too uncompromising. Both the two forms of Mathematics (on the one side the perceptible form of the science,—Geometry or the doctrine of Forms, —on the other, the comprehensible form,—Arithmetic or the doctrine of numbers) reach inwardly with exact precision towards the middle line, that is to say, towards the boundary line between the two domains of the understanding and Perception by the Senses. But inasmuch as mathematical science reaches outwards only exactly so far as the boundaries of this intermediate region, and does not cross it, so there arises between its two parts a reciprocal independence, an exact Parallelism which is nowhere else to be found between perception and thought. That which is thought mathematically contains nothing which might not also be perceived, and that which is perceived mathematically embraces no forms which might not also be grasped by thought. Here that unconscious shifting to and fro, of which we spoke just now, does not take place : every mathematical conception, every mathematical representation of ideas, has its appointed and immovable place. The two mathematical fields of intellectual operation are not identical,—the diagram shows how entirely autonomous they are,—and yet they are a matched pair, the one

being the counterpart of the other. On the other hand, the sharp definition of the middle line conditions such an uncompromising antithesis of the two mathematical functions as nowhere else occurs between perception and the representation of conceptions. Here there is no such gradual crossing over as we found between other Schemes and Symbols. Geometry is pure Symbolism ; the science of numbers is Schematism devoid of all Perception, it is the prototype of what Kant called " thoughts without contents."³⁶ The conversion of the one into the other can only be effected suddenly, and is, as I shall show presently in detail, the result of a purely internal and arbitrary deliberation. Even where the two parts of the middle line are very close to one another—I shall give an example immediately,—there are no means of changing form into numbers gradually ; on the contrary, the concordance between thought and perception must be seen directly. If mathematics were not a purely human thought and perception, if we had to derive them from experience, as for instance we do our perceptions of the movements of bodies, then indeed we should be in a bad case ; for Nature, as outer experience, gives us no handle whereby we may bring form and numbers into connection. By good luck, however, our empirical shallow pates are at fault, and in geometry we possess our archetypical Symbolism, and in algebra our archetypical Schematism, and therefore,—pray note this *therefore*—since mathematics are a form of thought and perception dwelling in us, and since they exactly fill that frontier domain of our intellect, therefore it is here, and here only, that we are in a position to convert Symbol into Scheme and Scheme into Symbol in their absolute entirety.³⁷

I shall make this conversion clear to you by an example.

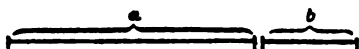
When a boy receives his first instruction in calculation by letters (Algebra) the poor wretch is in the first place

compelled to learn by heart a series of equations, of which he can make neither head nor tail, not because there is no food for thought in them, but because on the contrary they are matters exclusively of thought, since they deal with pure and therefore empty ("void of contents") conceptions, absolutely without any perception. The first of these equations runs thus :

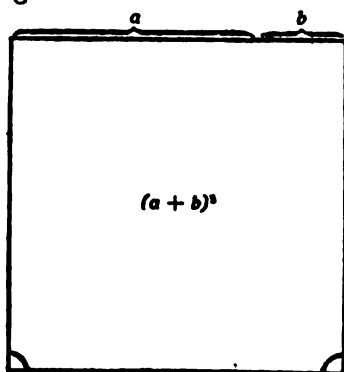
$$(a + b)^2 = a^2 + 2ab + b^2.$$

That is to say, a and b added together and then multiplied by themselves equal a multiplied by itself, added to twice the product of a multiplied by b , added to b multiplied by itself. Is not that a terror to listen to? But if we take heart, and jump out of schematism into the symbolism of our intellect, we immediately see the truth of the proposition, without wasting a single thought on the matter. Let me show the thing in a diagram, only begging that you will not exercise thought upon it, but just simply open your eyes.

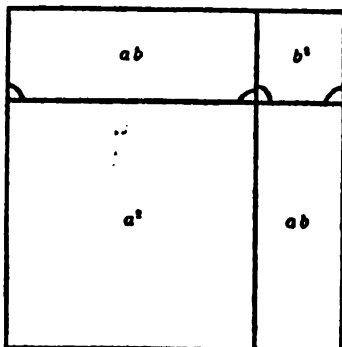
We take a line a and add to it in a straight line the line b .



And now upon this line we build an equilateral and right-angled quadrangle.



What you see here is $(a+b)^2$. That this square is equal to the square on a increased by the square on b , increased by twice the right angle which consists of the length a and the breadth b , you will see directly from the following construction which I build into our quadrangle.



In this way Algebra has been converted into Geometry, the scheme of numbers into a Form-Symbol. And you need only invert this simple example, that is to say, think of the square and the construction introduced into it as the starting-point, in order to understand that it must of necessity be possible to convert every geometrical construction, every play of constructive phantasy, into a purely comprehensible, entirely perceptible, in other words algebraical, expression of figures.

In the case which we have just been talking about mathematical perception and mathematical thought were in close proximity to the dividing middle line: there was therefore no difficulty in grasping the comprehension as material, the perception as abstract: generally, however, they are far removed from that line, and it was Descartes who first taught us how we must set about in order to succeed in revealing the Scheme as Symbol, the Symbol as Scheme, a discovery by means of which he became the founder of the so-called higher mathematics. And

here it is that we must now follow him if we wish once for all to ascertain the relationship between thought and perception, which is indispensable for any understanding of Kant.³⁸

The whole course of our considerations up to the present will easily convince you what a special attraction mathematics must have exercised on a man like Descartes, on a man whose distinguishing gift it was to discover Symbols and Schemes, in other words, to make the visible invisible, and the invisible visible. Yet, if we wish to understand Descartes' personal method of perception, it is important that we should be accurately instructed as to his position in regard to mathematics, and that is just where our school-books lead us astray. In order, therefore, to be able to speak of Descartes' mathematical achievements, my first business must be to dispel the common, and almost without exception ruling, misunderstanding about Descartes' conception of mathematics, and about the place which they occupy in his whole thought. This is the only way in which we can extricate ourselves out of the jungle of meaningless phrases into the free Pamir of clear insight.

In our scientific knowledge of Nature mathematics play the part of the mechanism which electric engineers call a commutator or current reverser. As soon as we succeed in arriving at phenomena,—even should it be in so arbitrary and contradictory a way as was the case with Newton in his doctrine of gravitation,—the game is won; we go on turning the current, i.e. the perceived into the conceptible, and the conceptible into perception, exactly as in the $(a+b)^2$. The one helps the other forward, and so we are ever rising higher and higher, and that without ever falling into error, for the simple reason that we are only working within our own intellect, and so make images and thoughts take their proper places in regard to one another. That was what Descartes, after

Plato, was the first to see ; he it is who endowed us with the thought of analytical geometry, with which we shall immediately busy ourselves more closely : yet he did not remain caught in the meshes of purely mathematical ideas, but his masterful intellect stretched out far above the science of mathematics. If it is absurd to follow Schopenhauer in representing Descartes as undervaluing mathematics, so it is hardly less full of misunderstanding and misleading to exaggerate the significance of mathematics in his thought and for his philosophy. The image of the æther and the thought of the law of *Inertia* are sufficient proof that his development of this mathematical juggling only served him as a preliminary exercise, and so he holds that it is to be understood by others, as his *Règles pour la direction de l'esprit* clearly set out. The doctrine of numbers and forms does not contain truths ; rather is it in one respect quite empty, the emptiest thing that one can imagine : for in it neither is perception nourished by comprehensions from outside, nor do its conceptive gymnastics allow of enrichment by special thoughts ; mathematics are simply a system of formal principles of perception and the concatenation of conceptions.³⁹ Descartes is continually laughing at the professional *calculateurs* and *géomètres*, and says that their business is *de s'occuper de bagatelles*. Open any work on philosophical history, you will find everywhere that Descartes declared that mathematics are the "origin and source of all truths." Nothing has done so much to turn good brains amongst us from Descartes as this reputed saying. For what is one to think of so silly an assertion—at best a sort of mythical Pythagorean symbol of Nature, something which was in truth further from this man than from all others? And yet no man doubts the authenticity of the position, otherwise it would not be quoted with the usual inverted commas in one learned German work after another, and the whole

thing is just a matter of mistranslation. The passage in question occurs in the XIth volume, p. 219, of Cousin's edition. Descartes has just set out the first principles of his Method, which he reduces to two principles only: first and foremost, and as indispensable, the clear perception of the object (*l'intuition*); next, as second, the consistent and unbroken deduction of the propositions (*la déduction*). Here the perception of the senses and understanding appear in their first and most elementary relationship.⁴⁰ Still their reciprocally conditioning interplay cannot but lead us much further. So Descartes points to Mathematics as an example, and as the only safe schooling for the application of this quite universally adopted Method,—mathematics which he holds to be incomparable and indispensable as an exercise of the alliance between the most manifest perception and the strictest logic—and then comes the sentence which has given rise to the misunderstanding to which I have alluded: *je suis convaincu qu'elle est supérieure à tout autre moyen humain de connaître, parce qu'elle est l'origine et la source de toutes les vérités*. The pronoun *elle* refers to the Method, the great universal Method, the Method of the reversion of the current,—not to Mathematics! The Method of the reciprocal interpenetration between perception and thought is the source of all true knowledge—this Method! In no way mathematics by themselves and of themselves, of which Descartes on the following page assures us that there is nothing more empty. *Rien de plus vide*. Even as a matter of grammar the thing is out of court. *Elle* could not refer to mathematics which are almost always spoken of in the plural, and in this very passage are without exception given as *les mathématiques* and *elles*. How little Descartes was inclined to look upon mathematics as the "source of all truths" is sufficiently manifest from the fact that he reckons *les nombres et les figures* among those ideas *qui ne peuvent pas être estimées*

rien pur néant, quoique peut-être elles n'aient aucune existence hors de ma pensée, and that in another place he says of them, *elles ne peuvent pas être considérées comme des substances, mais seulement comme des termes sous lesquels la substance est contenue.*⁴¹ But that is the way in which we treat our great men ; instead of adopting an infinitely subtle, vivid, pregnant knowledge, we accredit the genius with any manner of patent absurdity at which every commonplace man runs a tilt with solemn self-satisfaction.⁴² Just as little truth is there in the affirmation that Descartes taught that philosophy was destined to become a "universal system of mathematics," an affirmation which we in the same way meet everywhere. He, on the contrary, called attention to the fact, as Plato had already done, that in a series of Sciences,—he mentions optics, astronomy, mechanics, acoustics, everything must at last come to a question of mensuration and figures, and this remark leads him to the affirmation that all these sciences in combination with geometry and arithmetic form *une science mathématique en général*, or *une science mathématique universelle*. But this description holds good only in contradistinction to the other sciences, and so far from saying that the universal science of mathematics is all-embracing, Descartes asserts expressly, "I have busied myself so much with it that I think that I may henceforth devote myself to higher sciences, without having to fear being over-hasty." Descartes would have agreed with Kant, "Philosophy makes use of mathematics only as an instrument." For the rest he himself clenches the question into a convenient and correct formula when he says, "In my method the science of mathematics is the husk and not the core."

It was indispensable to replace a conception that is meaningless and false into the bargain by a true appreciation of Descartes' conception. So much for that. There is only one more thing which ought to be brought out in

this connection, and that is the strong insistence which he lays upon perception as the source and fountain of all truths, for that is the true conception of Descartes' teaching. It would be quite imaginable that a philosopher might have set up this "mathematical method," and yet have taken the abstract side as his starting-point. Descartes did not do that. On the contrary, just as in mathematics he takes his stand upon geometry, so he consistently insists that perception (*l'intuition* as he calls it) is the one and only indispensable foundation of all knowledge. What he prizes above all in mathematics is that "they exercise the phantasy in the right conception of forms and motions, and so accustom us to represent phenomena to ourselves correctly."⁴³ It is not the least of the achievements of the pioneer that he introduced the principle of perception into philosophy in the stead of the method of tyrannical and sterile logic which up to his time was alone dominant. It you read the writings of Descartes, you will at once be struck by the frequency with which such expressions as *voir clairement, concevoir fort clairement et fort distinctement, imaginer clairement, la conception évidente d'un esprit sain*, etc., occur: the foundation-stone upon which the whole of this philosophy rests, is simply clear perception, and so it is that the first power of man which must be methodically developed, is *la perspicacité en envisageant distinctement chaque chose*, which means, "the piercing glance which shows itself herein that we should see everything clearly." Yes! but "perceptions without conceptions are blind"; it is conceptions that first make them intelligible. Thus it is that in Descartes the algebra of *déduction* follows upon the geometry of *intuition*, and that the *sagacité à observer rigoureusement l'enchaînement des choses* follows upon *perspicacité*. It is characteristic of geometry that by itself it does not carry us very far. It is true that a carefully planned geometrical

construction contains all the connections which may later be drawn from it, still the eye is clumsy and confused, and the more we succeed in converting that which is seen into that which is thought—in this case connecting forms into symbols of figures,—the richer will be the results. This experience drawn from the practice of mathematics was applied by Descartes to all other spheres of thought, exacting that we should first see clearly, and then dissect with flawless logical keenness. Without a brilliantly powerful perception of the material empirical world, no true knowledge,—nothing but cobwebs of the brain! Without an “algebraically” dexterous analysis of that which has been seen clearly and lightly, no true science, no philosophy! It is always the same principle: the interplay between understanding and the senses, between conception and perception, between Scheme and Symbol. And of all importance is the doctrine that perception always takes the lead, while logical dissection exclusively comes into play in the second place. Pure intuitions of reason and pure logical arguments have no value for Descartes; they are objectless. In contradistinction to the schoolmen not only of his own time, but also of the nineteenth century, Descartes declares roundly, “logical forms and syllogisms are of absolutely no use for the discovery of truth,”—“Dialectics are rather a hindrance than a help.” They can only play a part secondarily,—only in the analytical investigation of that which has been discovered by direct and experimental perception.⁴⁴

That is what Descartes understands by his “mathematical method.” Fundamentally his attitude towards mathematics is precisely the same as that of Plato, who had already suspected and preached the intermediary position of mathematics, and on that account ascribes to the exercise of mathematical methods an incomparable significance for the development of the power of knowledge, but nevertheless laughs at the professional mathe-

maticians when he says, " they make themselves ridiculous with their fussing, as if with their complicated calculations and barbarous terminology they were achieving some mighty thing, whereas the whole significance of mathematics lies in the fact that they serve as a medium of philosophical thought and as a road leading to knowledge."⁴⁵ Descartes was conscious of this historical connection. According to him the thinkers of antiquity would have found it impossible to recommend mathematics as a philosophical instrument, if by them they had only understood calculation ; he was more inclined to believe *qu'ils reconnaissaient une certaine science mathématique différente de celle de notre âge*, and it was this other science of mathematics which he once more took up.

I think we have now quite intelligibly shown how there is no inconsistency in Descartes when he at one and the same time declares that there is nothing " more empty " than mathematics, and in spite of that holds that the philosopher is bound to spend much time over their study. And since you now know that when he busied himself with mathematics it was not on account of any formal whim, not on account of any Pythagorean cobwebs of the brain, but on the one hand in the interest of the precedence of perception over thought in every investigation of nature and mankind, and on the other hand, in the interest of the conscious handling of that method by which perception and thought reciprocally help one another. Since you also are in possession of the comforting assurance that it is no barren philosophy, but scientific and living perception of the world that is at work here, so I hope that you will have the courage to climb one last rocky peak with me where the sharp pure air of the glaciers will be wafted around us. If Descartes has by others been misunderstood, and has remained unrecognised, there is one act of justice rendered to him

by every cyclopædia. He is the first inventor of analytical geometry, with which he revolutionised our whole doctrine of geometry and numbers, and gave the impetus to the discovery of the so-called higher mathematics, upon which again our modern sciences of Physics, Mechanics, and Astronomy are based. It is now necessary that you should see Descartes,—who made his discovery not as a professed mathematician, but as an amateur after a few months of self-taught studies,—at work in this direction ; the detestation in which we hold all verbosity, should steel you not to rest before you have grasped in its solid significance the question which lies at the bottom of our observations of to-day. I admit that we shall here have to tread the special path of mathematics, and that is distasteful to the man who is no mathematician ; yet I hope we shall succeed in applying ourselves to the subject in such a way that even those who are absolutely ignorant of mathematics will be able to see exactly what we are driving at. And with this we shall in the first place gain the advantage of obtaining a quite exact idea of Descartes' individual method of Seeing : in the second place we shall gain the knowledge, not merely theoretical but absolutely concrete resulting from practical perception, that every transition from thought to perception and vice versa,—even where (as in mathematics only) it takes place with absolute precision—has in itself something artificial and arbitrary, from which it results that perception which is thought always remains more or less a Scheme, and thought which is perceived always remains more or less a Symbol ; last not least, we shall be driven on a purely perceptible and therefore entirely safe road, to the very central point of that Kantian perception to which it is otherwise so difficult to gain access, and which is so dark and difficult to illuminate. That point is the conception of the Transcendental. In this way Kant's method of Seeing the world will no longer

be so foreign to us, and we shall have gained in addition an advantageous standpoint for a later study of his philosophy. For these reasons I urge you to follow me for a while in the pure domain of mathematics.⁴⁶

* * * * *

In order that you may make your way with some pleasure into the subject of analytical geometry, which touches the innermost essence of mathematics, I must at the outset tell you what was the aim of this discovery of Descartes. It is necessary that you should know this, otherwise you would see nothing but a sort of *ipse dixit* in the proceeding, and that might mean astonishment, but it could not mean understanding.

With the help of perceptible mathematics, namely geometry, simple problems may be solved, but not complex problems; human imagination soon gives up the task: a very complicated system of lines and points and bodies, which assert themselves in various ways, is something which we cannot put with perfect clearness before our eyes; we are not in a position to compare differently formed bodies directly with one another; we are not able to see, to recognise with our eyes, the outcome of it all. But in a quite different measure we are able to deal with the mathematics of conception, that is to say with numbers or the symbols of numbers; for in this case the master law-giver is not perception, but Logic, and that implies the opportune succession of a linked chain of insight into facts, instead of a Present only to be deciphered by a direct and simultaneous combination. If we deal with numbers logically we need not trouble ourselves about the perceptible meaning of each single operation of calculation; the correctness of the result is the important matter. That is why men very early came to reduce lines and rectangular figures to numbers, as, for instance, expounding the relationship

of the square on one side of a rectangular triangle to the squares on the two other sides, not perceptibly by drawing figures, but arithmetically and algebraically. But how arrive at a universally valid expression in numbers for complex figures, such, for instance, as curves? That was the question upon which many men busied themselves, and no one found the solution.

Here it was that Descartes came to the front as a creative genius. He perceived that to reduce a curved line to a symbolical expression in numbers, the first necessity must be to bring the particular curve (circle, ellipse, volute, etc.), into relation with straight lines. The next task to be solved was the discovery of these straight lines. Once solve that difficulty and discover the relations between the curved line and the straight line, then what was elusive would be brought to a standstill, the curve would be bent straight, and the object would be attained; for as you will see presently, straight lines can always be considered as numbers (real or symbolical), and a fixed relationship between straight lines is therefore at the same time an arithmetical relationship. Thus the curve which is seen, becomes an unseen, logical, arithmetical expression, and can take its place in every arithmetical series by means of various calculations. In this Descartes succeeded. With simple unconsciousness of the magnitude of his achievement the first sentence of his *Géométrie* tells us: *Tous les problèmes de Géométrie se peuvent facilement réduire à tels termes qu'ils n'est besoin par après que de connaître la longueur de quelques lignes droites pour les construire.* As coins and watches disappear in the hands of a conjurer, so in the hands of Descartes the visible became invisible, the geometrical, arithmetical. But you will at once remark that with this achievement the inversion was of necessity given at the same time. For it was only necessary to strike into the opposite direction, and at once we were in possession of a form

for every futile arithmetical formula! Here you have the whole Descartes. Goethe declares that man can wrest from Nature nothing more valuable than—

*Wenn sie ihm offenbare,
Wie sie das Feste lässt zu Geist verrinnen,
Wie sie das Geisterzeugle fest bewahre—*

“When she reveals to him how she lets the substantial lapse into the Spirit, how she preserves as substance that which is the child of the spirit.”

Since Descartes has pervaded the life of man as teacher, there has been no geometrical form which we have not been able to let “lapse into Spirit,” that is to say, turn into an arithmetical expression,—into an equation merely thought,—no arithmetical picture “child of the Spirit” which we have not been able to convert to something seen, something substantial. That is the essence of analytical Geometry.

Now we may proceed to a closer exposition.

I hope that you are not scared either by Greek words or by the jargon of mathematics. Both are accessible if you only approach them in the right spirit. Greek was once spoken in a sunny land,—spoken by men who possessed the immeasurable luck not to be forced, as we are, to gag their spiritual life into dead idioms,—men among whom the sage drew his words from the same living well as the shepherd, and so was understood by all: and as regards mathematics this discipline by the application of the right method, was capable of being brought home even to the least gifted,—at any rate in a certain measure,—for mathematical ideas are common to us all, and in their essence elementary. *La facilité suprême* is what Descartes praises in all true mathematics.

Analysis comes from *ἀναλύειν*, a word which means to unloose and also to set free: it signifies therefore the unloosing of a single perception into simpler component parts,—the setting free of the elements out of a com-

bination. That is why the resolution of any body into materials which are not capable of further disintegration is called "Analysis." In mathematics the word implies in the same way the disintegration of a given proposition into its component parts. You will, however, at once meet me with the question, How can one disintegrate figures into component parts? To represent to myself 70 as 10 times 7, or as 58 plus 12, or as 210 divided by 3, is a purely arbitrary proceeding in my brain. The number 70 or 7000 or 7,000,000 is just as simple and just as impossible of disintegration as 7 or 1. Certainly; and yet it is just as capable of disintegration, for the number 1 is capable of disintegration *ad infinitum* so soon as it pleases me to look upon it as a product. The same holds good of figures; a circle is a circle, a globe a globe, a pyramid a pyramid, each positively a symbol of unity: still I am able to imagine the globe as actually consisting of segments which have grown together, as in the case of the orange, and in accordance with that I am also able to take it to pieces. I can think of the circle as a line rotating round one of its extremities, or as a variety of an ellipse, or as a slice taken out of a cylinder or a cone, or as the place of an endless number of coincident equilateral triangles with the same vertical point, and in fifty other ways besides. In this way the structural unity is at my bidding set free into multitude. I find myself within the domain of pure human will. Here there is no such practical concrete analysis as there is in chemistry, where by mechanical methods of attack I can resolve a combined body into several qualitatively different component parts, nor is there any operation analogous to philosophical "analytics," in which complicated ideas and conceptions are reduced to the elements of which they are composed: but mathematical analysis is the autocratic setting free of a given magnitude into several other magnitudes for purely practical reasons, in

order, that is to say, in that way better to calculate, and this end is attained as soon as the original idea in space has been reduced to an expression in which there is neither space, nor possibility of representation,—an expression which is in accord with numbers. In a wider sense the converse process belongs also to mathematical analysis,—the construction of a superficial image or of a solid body out of a combination of numbers. It had already occurred to the Greeks of later times to transfer to the realm of numerical calculation geometrical problems which it was difficult or impossible to solve by direct means. But the next point was one which they did not attain, for it was contrary to the genius of that people to convert the visible into the invisible, and therefore they made no great progress in that direction. In contradistinction to the Greeks the Aryan Indian achieved his best work in the logical calculation of conceptions (arithmetic and algebra): but he lacked that geometrical eye which is dominant in matters of form. It was the Teuton who was the first to possess the right intellectual aptitude for this twofold work, and Descartes was the one and only man who stood so exactly upon the boundary line that, without being a mathematician, and after a short period of study, he by pure instinct forced the door through which hundreds and thousands dashed after him. *Car en mathématiques*—he says in the last sentence of his *Géométrie*—*lorsqu'on a les deux ou trois premiers termes, il n'est pas malaisé de trouver les autres. Et j'espère que nos neveux me sauront gré, non seulement des choses que j'ai ici expliquées, mais aussi de celles que j'ai omises volontairement, afin de leur laisser le plaisir de les inventer.*

Descartes, as I have said, set to work with the utmost simplicity. He was in the twenties, and an officer; in order to fill the leisure of winter quarters, and because he had remarked that the study of the mathematical sciences is of incomparable methodical value (*elles accoutument*

l'esprit à se repaître de vérités),⁴⁷ he undertook to take a bird's-eye view of this discipline. But he had always abominated numbers, the wading about in a sea of endless calculations; *pour ce qui est des nombres je n'ai jamais prétendu d'y rien savoir*, he writes to his mathematical confessor Père Mersenne; he belongs to the open-eyed division of mankind; mathematics are for him the science of forms and motions: his repugnance to arithmetic is so strong that it is only geometrically that he establishes all its operations, addition, subtraction, division, multiplication, even the extraction of Roots. *Toutes ces opérations doivent être ramenées à l'examen de l'imagination, et il faut les figurer aux yeux, pour ensuite en expliquer l'usage et la pratique.*⁴⁸ But Descartes soon remarked that mathematics as taught by the professors are a prosy, dull affair, a compound of many parts: he despaired of learning them in this way, and of making them into a living knowledge. And yet, he said to himself, all these branches of mathematics deal with the same thing, the relation of magnitudes to one another: a plague upon all their Geometry and arithmetic! I shall henceforth only fix my eyes directly upon these relative magnitudes: *je pensai qu'il valait mieux que j'examinasse seulement ces proportions en général.*

Of course you understand what he means by the word *proportions*. It may be a matter of comparison of absolute magnitude between similarly formed bodies; that is the simplest case, and always without more ado to be referred to the difference of numbers, in other words to arithmetic; but the comparison may also be the relation to one another of different forms, and this is what is so actively present to Descartes. In this case it is not a question of whether a thing is great or small, but of the forms which are possible to our phantasy, seeing that each is different from the other, and without the absolute magnitude coming under observation. The circle is a form differing

from the square, it is also a form differing from the ellipse or the volute. The same holds good of a globe, a cube, a pyramid. They are different forms. Humanly speaking each one of these forms is subject to a special law, or if you prefer it a special thought, and this thought is a fixed relation to the extension in space towards the various directions. Goethe says of the perception of natural objects, "There is in the Object something of an unknown law which corresponds to the unknown law in the Subject."⁴⁹ In geometrical forms we supply both object and subject, and thence the idea of law is at once a matter of compelling strictness and of boundless elasticity. A ball of the size of the planet Jupiter is, as a matter of thought, as like a billiard ball as two hairs are to each other, for the reason that the relative proportions are the same: the comparison of the two is exhaustively expressed by a simple arithmetical proportional equation:

$$a : b = 1 : x$$

a , the billiard ball, is in relation to b (Jupiter) as 1 to x (the requisite number). But, on the contrary, we are dealing with a quite different sort of comparison if I hold the billiard ball and the cue together, and do not wish simply to establish the relative bulk of the two, for which a pair of scales would suffice, but to bring into comparative relation the law of form of the one, and the law of form of the other, that is to say, reduce them to an equation of mutual relation. All this, the interrelation of magnitudes and the interrelation of forms, is what Descartes speaks of as *proportions*. What he asserts is this, that the different branches of mathematics ultimately *ne considèrent autre chose que les diverses proportions qui s'y trouvent*. And inasmuch as the monotony of mere arithmetic is repugnant to him, and he is wearied by the calculations incident to the geometry of solids, he just asks himself one question: What will be the simplest

way for me to compare different forms with one another ? The answer is, by reducing the problem to one of the relations of various straight lines to one another, *à cause que je ne trouvais rien de plus simple ni que je pusse plus distinctement représenter à mon imagination et à mes sens.* You see then the first and constant thing postulated is something which can be represented, clearly represented, obvious to the senses. Yes. But supposing that I should analyse many forms in this way, I shall obtain a whole forest of lines. How can I carry them in my memory ? And how can I continue my investigations of their reciprocal interrelations ? For this purpose the lines must be reduced to an expression in numbers : *il fallait que je les expliquasse par quelques chiffres, les plus courts qu'il serait possible.* And he ends by saying, *je pensais que par ce moyen j'emprunterais tout le meilleur de la géométrie et de l'algèbre, et corrigerais tous les défauts de l'une par l'autre.*

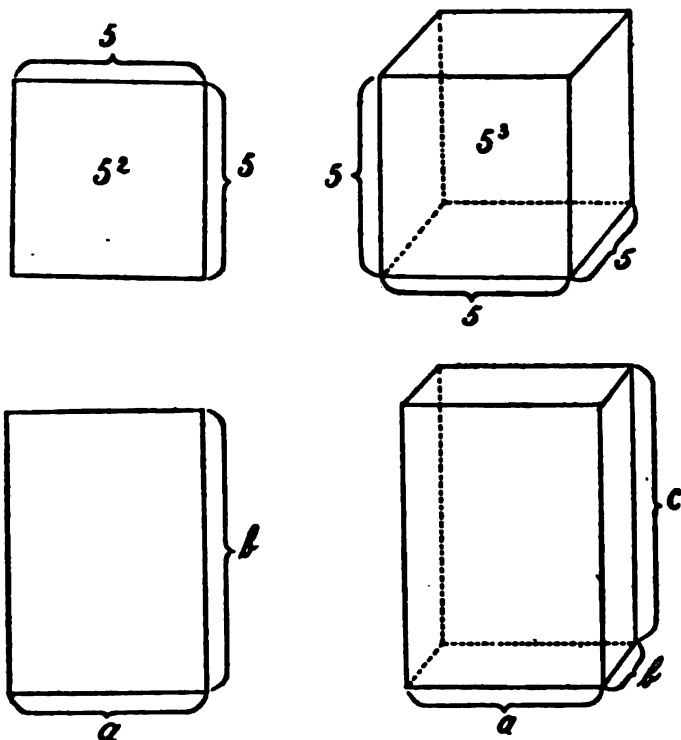
You now know how it was that the idea of analytical geometry arose in the intellect of Descartes, and in what form it floated before him. It contains absolutely nothing abstruse or learned which need scare us laymen. On the contrary, it was in direct opposition to the professorial men of science that Descartes invented his method, and in answer to a friend who communicates to him attacks from all sides on his geometry, he writes, *J'aurais mauvaise opinion de mes pensées, si je voyais que les doctes les approuvassent.* I imagine that you will already have remarked what is the turning-point of the whole method. It is the establishment of the line as intermediate between form and Numbers. And this means exactly : it is the discovery of that point wherein the doctrine of magnitudes, sense and understanding, perception and thought merge into one another, where the visible becomes invisible, and vice versa. In a late work, which unfortunately remained unfinished, the *Règles*

pour la direction de l'esprit, Descartes very clearly laid down this mediatory principle of his: *par les lignes il faut représenter tantôt des grandeurs continues* (i.e. forms) *tantôt la pluralité et le nombre*; *l'industrie humaine ne peut rien trouver de plus simple pour exposer toutes les différences des rapports*; so the relation between the straight lines stands exactly in the middle, pointing on one side to the visible form, on the other to the essence of abstract numbers.

We are now sufficiently equipped to start upon the concrete observation of analytical geometry. But I have to insist that what follows must be treated as a series of ideas without your ever for a moment being contented with thought alone, as apart from ocular demonstration.

Surely it is plain to the eyes that I can, if I so choose, conceive every straight line as a number? For example, if three straight lines stand in relation to one another as 5, 4, and 3 (it is immaterial whether we are speaking of yards, or feet, or metres, or miles), I can call them simply 5, 4, and 3, and so calculate with them: every builder does that daily, and that is really geometrical analysis, for it is the conversion of a conception in space into a number which has nothing to do with space. But your builder now goes a step further. Supposing that the line 5 represents the one side of the house which is to be built quadrilaterally and that the builder wishes to know the size of the area for his work, there is no need for him to measure it with his measuring tape, nor to set it out on paper: the required area results from the sum 5 times 5. This sum 5 times 5 is what the science of arithmetic calls the square of 5, or 5^2 , or 5 in the second power. And if the house were to be of the same height as the breadth, the builder need only write 5^3 that is to say, 5 times 5 multiplied by 5, and he would know exactly what would be the space included in the cube-shaped

house. If the sides of the house are unequal, he has to multiply the one by the other as $a \times b$, then by the height, c , and with this $a b c$ he has at once at his command all the conjuring tricks known to him by the study of arithmetical logic, without reference to the concrete house which has to be built.



For as soon as I have written down the numbers instead of the line or the area or the body, the visible form fades away— a^2 is simply the number a multiplied by itself, b^3 is b multiplied by itself and then again by the product, $a b c$ the multiplication of the numbers a , b , and c with one another.⁵⁰ The form absolutely disappears, and only the

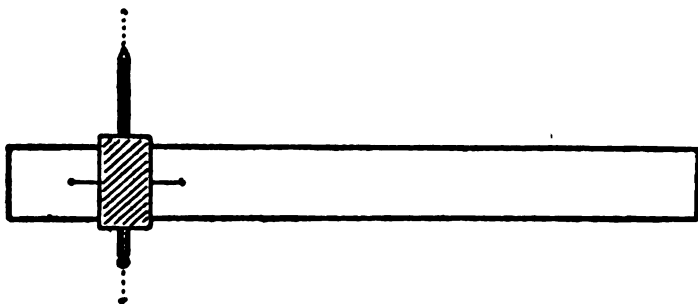
measurements remain. Up to this point the matter is simplicity itself. But if you examine your power of imagination, it will soon answer that of all forms it is only those that are rectangular that allow themselves to be reduced in this simple way to lines, and consequently again resolved into numbers, whether these rectangles be plain or solid. All these rectangular forms can be imagined as originating in the rectilinear movement of limited straight lines, and this rectilinear movement may, like the straight line itself, be expressed as number without further trouble. If I say a I name the line: if I say a^2 I name the superficies which comes into existence when a moves lengthwise along its length; if I say a^3 I am naming the cube which arises when this superficies moves upwards to the length of a . The same thing takes place in the case of rectangles with unequal sides; we can represent all of these to ourselves as proceeding from the movement of two or, as the case may be, three lines of different lengths. Thus $a b$ is the movement of a along b , and $a b c$ is the movement of the superficies $a b$ along c . The line is therefore comprehensible as a number (explete or symbolical), and what is perceived as the movement of this line is to be understood as the multiplication of the number: a^2 is the multiplication of the number by itself, $a b$ the multiplication of the number by another number. Therefore, inasmuch as rectangular figures can without more ado be reduced to single straight lines and to single rectilinear movements,—it is easy to reduce them to an expression in numbers. The numbers 5, 4, 3, or the letters a , b , c , correspond to the length of the component lines, and what we call *exponents*, that is to say, those smaller cyphers which Descartes taught us to write above and to the right of the larger figures,—for that was his invention,—denote the movement of the lines. As soon as you conceive of the matter as visible, these algebraic figures are shorn of all their abstract

terrors. The small 2, as in a^2 , points to a simple movement out of which only a superficies arises, therefore a space of two dimensions, hence the 2; the small 3 points to a double movement, and consequently to a solid body, that is to say, a form of three dimensions, hence the 3. When therefore I reduce rectangular figures to the measurement of length and indications of movement, denoting the measurement by ordinary cyphers, and add the movements by small cyphers written in above, as exponents, I have obtained a very simple expression which I can, at will, look upon as a visible form, or as an arithmetical conception. But how am I to deal with forms which are not rectangular? Question your own sound natural power of conception. Unless a man be a second Descartes he will have difficulty in finding the answer.

Not to extend this mathematical excursus too far, we will only take into consideration one single case, that of the curves in a plane, that is to say, of such curves as you may draw upon a sheet of paper, and which correspond proportionally to the rectangular superficies. How can these curved lines be made capable of a similar solution into arithmetical magnitudes? Without the help of straight lines the transition from curves to numbers is unthinkable. Numbers have no analogy in any shape with visible things, beyond on the one hand the circumstantial analogy with objects exhibited side by side, and on the other hand with straight lines. This second analogy is not, as you might think, drawn from the first, but arises out of the essence of numbers which are to be thought of as a rectilinear continuation. The numbers 5, 6, 7, are essentially identical in their nature, only 6 is longer than 5 and shorter than 7.⁵¹ The curve, on the other hand, is an idea which arithmetical conception can never reach: it lacks the necessary pliability. The essence of the curve is form, the essence of arithmetic is indifference to form. It is therefore only the straight

line that can be of any assistance in the task of converting form into numbers. For we may define the straight line as follows : it is the only line which even if it be produced to infinity creates no form. It is pure magnitude and pure numbers. How then can I bend into pure formless magnitude and pure comprehensible numbers magnitude which is possessed of form and numbers conditioned by form, and at the same time locked in form? Here, too, I can only succeed if I reduce form to movement, but even so the movement must be rectilinear.

Take a ruler : let a slider with a pencil slide to and fro from one end to the other on this ruler, and let this



pencil be placed perpendicularly to the ruler in a capsule which may be drawn out and compressed at pleasure : if you hold the ruler immovably on a sheet of paper you are able to draw the most complicated curves with the point of the pencil, as you, on the one hand, push along the ruler the sliding capsule which carries the pencil, and on the other hand, by lengthening and shortening the distance between the pencil's point and the ruler. You must now consider the resulting visible curve as being produced by the length of the ruler and the pencil ; and as a matter of fact that is what it is. So this curve expresses the varying relation between three straight lines, of which the one, the ruler, has retained its length unaltered, while the two others which express the length

of the pencil and the position of the slider on the ruler, have been changeable. Looked upon purely from the mechanical point of view, that is the proceeding of Descartes in the analytical dissection of a curve. It was with the help of such considerations and instruments that he arrived at his thought. You see how this man is always and everywhere wandering on the boundary line. The problem as a whole deals with the conversion of the visible into the invisible and vice versa. Its solution he arrives at by a perpetual shifting to and fro of the ideas of rest and movement. For the curve which he wishes to "analyse," the circle, the ellipse, the spiral, the volute, etc., is in the first place something granted, a symbol of that which is perfected, eternal, immovable. But next he considers how he may regard it as arising out of the movement of straight lines, and thus rest becomes movement. Then there is the return of movement into rest. For these lines in motion serve to attain an immovable arithmetical expression.

A concrete example will at once show how Descartes obtains the straight lines for a given curve, and out of the lines an arithmetical expression. I choose for the purpose the simplest curve in a plane, the circle.

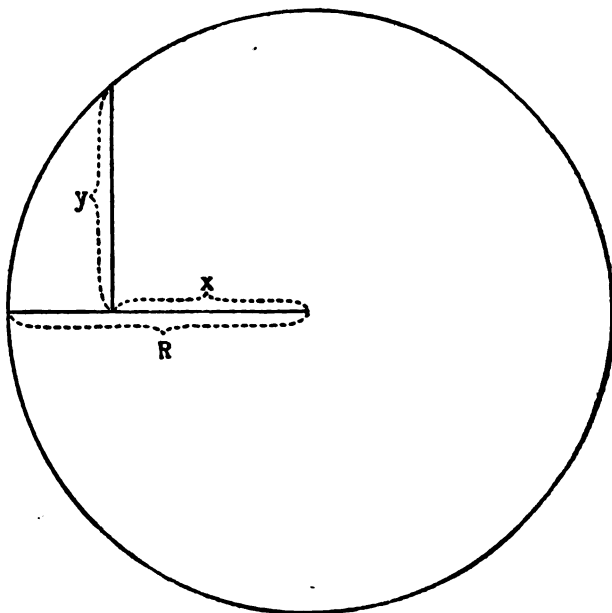
With the help of a piece of packthread and a piece of blue chalk I draw a circle on the wall. Our circle is obtained by turning a straight line round one of its ends: that, however, gives us nothing available for analysis, which needs the relation to one another of several lines. This causes Descartes to refer the generative law of this fixed figure to the relation between one immutable straight line of an ascertained length and two other movable lines (cf. our immovable ruler with the movable pencil attached to it). Only you must not for a moment imagine as regards the construction, which is the result, that it possesses any thinkable significance in nature, outside the human brain, or that in practice a circle can

come into existence in that manner; Descartes only delineates it, because it is his pleasure to do so, because the thing can be thought of in that way, and because all sorts of amusing results arise out of it. Well then, how does Descartes set to work? He accepts the circle as given, within it he draws two straight lines perpendicular to one another, and the feat is done. The one line—the most important one—he draws from the circumference to the centre. For the sake of greater clearness I draw the line horizontally, but I might if I chose draw it in any other position. This line is always called *R*, from the initial letter of the Latin word *Radius* which signifies the spoke of a wheel, and later was adopted into scientific language as a description of the half of the diameter of the circle. Descartes had all the more reason for retaining the sign *R* in that the French word for the half-diameter is *Rayon*, and the Germans have only to think of their own original word *Radspicbe* (the spoke) for the *R* to lose all the evil taste of the dust of the schools. This line *R* is a fixed, immutable, ascertained mathematical magnitude. If the circle is a concrete and present figure I can measure it with a yard measure: if we are only dealing with the form of the circle in general, I cannot represent any length in cyphers, but the line *R* is none the less a recognised, immutable magnitude, that is to say, in relation to whatever may be the circular line of which it denotes the half-diameter. Well then, upon this immutable line I set up at right angles to it a second line which, inasmuch as it is an unknown magnitude, I call *y*, and which I represent to myself as movable upon *R*, that is to say, which I can move to and fro upon *R*, from one end to the other, exactly as we did just now with our pencil. But this second line is not only movable, but also of variable length. In every single place, that is to say along the whole length of *R*, its length differs; and indeed the organic relation between its length and its

place is settled by the curve in question, in this case therefore by the line of the circle, inasmuch as we always produce this line y to the periphery of the circle by which we allow it to be cut off. If, therefore, this movable line is raised at the inmost point of R , that is to say, at the centre of the circle, it becomes itself a half-diameter and its length equals that of the line R ; that is the maximum length which it can attain; if on the contrary it is set up at the outermost point of R , it is immediately cut off by the circumference line, and its length becomes zero. Between zero and a length equal to R the line y can have every conceivable measurement. And, as a mere glance at the diagram will show, its length will everywhere be determined by its place, and its place by its length. One word more and then we shall have gathered all that we want. The line R is, as we know, immutable: but it now contains a movable element, namely the point at which the movable line y is erected. You need only think of the slider in our mechanical example. I will now make use of the centre of the circle as a starting-point, and from that measure the lines to the point where the line y meets the line R , and this line I will call x . Since y moves along R this line x is manifestly variable and its value, as a single glance at the diagram will show, will always diminish or increase in an inverse ratio to that of y . If y is at the centre, x dwindles away at once to zero. If y is at the outer end of the Radius, x becomes equal to R . x is, as you see, in the same case as y ; its length value can take every step between zero and the length of R ; but, in addition, its value must always of necessity be conditioned by y . As a result of this construction we have now three values, of which one, R , is immutable and the two others, x and y , are mutable. What unites these three values into one organic relation to one another, is first their fixed reciprocal position in space, secondly their fixed relation to the centre-point and to the peri-

phery of the circle by which they are bounded. Now as these values stand in a relation to the circle, so too does the circle stand in a relation to them, and in this way they will serve us to gain an expression for the curve in lines, and that means in numbers. This relation we can describe in the following very simple fashion :

$$R^2 = x^2 + y^2$$



That is to say, expressed in words, the square on R ,—no matter whether the circle be great or small, and no matter what may be the position of y , is always equal to the square on y multiplied by the square of x . But you must not be led astray if this equation talks of squares : for R , x , and y , are lines, and the exponent 2 points, as you will remember, to the movement of a line along its own length ; every one of these three squares is therefore

resolved by this formula into a line and a movement : but the line as well as the movement can be comprehended without more ado as a number ; consequently that representation of a visible geometrical relation is at the same time, if we choose, an algebraical equation, and that means a purely arithmetical expression. As such it belongs to the protean domain of abstract mathematics, " thought without contents " ; it is conception without perception, and so gains in pliability and logical multiplicity of significations what it loses in visibility. This algebraical equation ($R^2=x^2+y^2$) is the analysis of that flat curve which we call a circle.

I have no intention of stopping to furnish a proof of the correctness of this affirmation that $R^2=x^2+y^2$. It is very easily demonstrated geometrically, and is to be found in Euclid (as the Pythagorean proposition). Its interest for us only lies in the fundamental idea of Descartes, the idea of the resolution of the visible relations of measurement and form into invisible, abstract arithmetical relations. Any one who is interested in the matter can construct the proof empirically with the help of a circle and a millimetre measure. Nor shall I wait to show that there are other analytical equations which can be made up in behoof of the circle, and that for many other curves, as also for the analysis of bodies of three dimensions, a far more circumstantial process is needed ; the principle remains the same. Moreover, my conscience pricks me in that I have not led you precisely on the same way as that which Descartes followed, and because I have been so bold as to exhibit analytical geometry in a manner completely different from that ordinarily adopted. You can read Descartes, if you are able, for his *Géométrie* is not easy, inasmuch as he wrote it with purposeful obscurity in order to avoid plagiarisms ;⁵² or you can take up that beautiful monument of German industry, Cantor's *Vorlesungen über Geschichte der mathe-*

matih, if you wish to make acquaintance with pure mathematics in their historical development. In neither place will you meet with my exposition; if I have failed, this hint may be taken as an apology.⁶⁸ If I have taken my own road it has been because I had a goal of my own in view. My peculiar way of looking at the subject grew out of our precedent course of thought, to which it now carries us back. Let me therefore, in closing this mathematical excursus, only say briefly that this algebraical analysis of geometrical perceptions is the foundation of almost the whole immense development of modern mathematics, and with them of all physics. The expert mathematician, it may be said, sees in his mind's eye, in such a scheme as $R^2 = x^2 + y^2$, things which otherwise he would never have seen in the mere visible symbol of the circle. True, the seen curve has faded away, but in its place that creative law of form, as we have called it, appears perhaps even more distinct,—at any rate as a stimulus to new thoughts. The analytical equation is to the mathematician what the ground plan is to the architect; unintelligible to the layman, such a manner of schematising reveals to the expert things which he would never have been able to see in the concrete: that is to say, it leads him to the discovery of relations between the different forms which no power of perception would have been able to reach—and he has only to discover another, cleverly chosen, algebraical formula for his curve, in order to obtain an elevation in addition to his ground plan. He is now also in a position to investigate the properties of forms which, on account of their great complications, would be beyond the power of the eye to unravel, and perhaps impossible to represent mechanically. Thanks to this method, he has reached a point where he can investigate the properties of figures of four dimensions, as well as of others that are beyond the power of imagination.

You see that this road leads to the deepest depths of metaphysics, but at the same time and in the same measure to the contemplation of the unseen. For now all equations can be converted into form, and with the help of two lines which exactly correspond to the R and y of our example, dreary, dull rows of cyphers, such, for instance, as statistics, are conjured into curves which at once furnish every layman with intelligible ideas, and allow the mathematician to penetrate the mysterious laws to which Phenomena are obedient.⁵⁴

We need go no further now. Let me add a general survey.

What Descartes' intervention has signified for mathematics in general may, I think, be summed up in a remark which at the same time points directly to that which we have had in view in this excursus. We might indeed, unless I am mistaken, show that the peculiar duplex character of the infinitesimal calculus, called into life by Descartes and followed up under his instigation by Ferrat, Pascal, Barrow, Newton, Leibniz, the brothers Bernoulli, and others, rests upon the fact that it stands with one foot in perception, with the other in abstraction. To grasp the fundamental conception of the infinitesimal calculus (that is to say, remember, as "thought"), is so infinitely difficult, not to say impossible, that Carnot, one of the most competent of specialists, assures us that very many professional mathematicians have not understood the significance of their own calculations; yet as a consolation he adds: *il est certaines idées primitives qui laissent toujours quelque nuage dans l'esprit, mais dont les premières conséquences une fois tirées, ouvrent un champ vaste et facile à parcourir.*⁵⁵ Historically the infinitesimal calculus grew out of the observation of geometrical problems, and out of the lucky inspiration to consider these as phenomena of motion: far from being an abstraction, this mode of calculation is unthinkable

unless we take the perception of the senses as a starting-point. Infinitely small magnitudes are magnitudes that the eye no longer can see, but only the conception can still imagine: the transition from sensibility to understanding takes place here materially: the calculation by letters penetrates like a microscope where the object fades before the naked eye, and communicates "imaginary images" to the brain (see page 74 *seq.*). Perception and abstraction are both of them moving in a region near the central line of demarcation. Up to Descartes' time, then, mathematics had, so to say, always been hopping upon one leg, either in perception or in abstraction. He taught them to stride forward vigorously on both feet; the start in mathematics could not long be delayed. We too to-day, within our modest limits shall gain a similar advantage.

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We have now come to an end of the constructive part of this lecture. It would be delightful to follow Descartes still further; the proud, angular, domineering, and at the same time aristocratically reserved and sensitive nature of this thinker, fills us with respect and sympathy; and there would still be much to bring forward about him and his life in amplification and correction of the known descriptions of him; something of this will perhaps, now that we are quite accurately informed as to the principles of his method of perception, weave itself in automatically in the further course of our studies. But at this moment another duty lies before us, that is to say, to turn to account the sum of our labours of to-day for the recognition of Kant's intellectual aptitudes.⁵⁶

It is the fashion,—wrong as a matter of method,—to start from the simplest point, from that which analysis shows as the simplest component parts. Far rather should that which is best known serve as starting-point

in expositions and explanations, whether it be complicated or simple. This is the only way in which direct perception, with that power of persuasion of which it has the monopoly, can maintain its rights. That is why I chose as the main theme of my first lecture the conflict between Idea and Experience. In that way we certainly gripped the problem of perception by the most complex and difficult phenomenon that it perhaps ever exhibits. But the advantage was just this, that we at once faced the whole, that is to say, that which is living, true, and sure, as it is common and well known to us all. We all have our experiences and our ideas, and even if we are not accustomed to analyse them, one word is enough, and every one knows what we are talking about; and even though Goethe's perceptions and Goethe's ideas were of an august nature, they none the less spoke directly to our understanding, and that which was perceptible might almost have filled the whole lecture. Next, however, we followed Goethe's advice to "work our way out of the whole into the parts"; in the second lecture we grasped the problem more closely on both sides, when we made the conflict between the pure form of all perception and the empirical material of perception our chief subject of study. Simple, and apparently easy to survey, was the relation between the two in the plastic artist, who kept before his eyes the scheme of his understanding, half pure and half perceptible, in order that he might see more exactly, that is to say, in order to "think" more clearly that which was seen, to comprehend it more exactly: far more complicated did it become,—harder, that is to say, to expound, and so also harder rightly to grasp,—as soon as the understanding drew the phenomenon over to itself, so that the pure scheme of the senses became the main point, whilst the empirical phenomenon itself, or at any rate its foundation in the perception of the senses,—paled almost to fading away.

Calling to our support the conflict between physical optics and Goethe's doctrine of colours, we tried to gain as clear an explanation as possible of these relations. To-day a new conflict has arisen before us, no longer the one between pure perception and empirical perception; but that between perception as a function of the senses, and conceivable thought as a function of the understanding. Carefully considered, this conflict is far simpler than that between idea and experience, and even in its essence easier to grasp than that between pure and empirical; what makes it difficult to unravel is the complex interlocking of the parts: what I have had before me to-day as my chief aim has been to arrive at a clear conception upon this point; no man in the whole history of the world could render us such conspicuous service in this as Descartes.

You must know that with the help of Descartes we have become acquainted with a way of seeing, a recognition, a conviction, a view, a method,—call it what you will—which is absolutely fundamental for Kant's philosophy. And this point is just the one of all others which is looked upon as the darkest in his philosophy; it is the *pons asinorum* before which the great majority of the flighty searchers after knowledge turn tail—and not they alone! I could name a worthy modern student and editor of Kant, who only so far masters the difficulties which are to him insuperable, that he declares roundly that this fundamental thought of Kant's "has no scientific value," and therefore that it is not worth while to break one's head over what Kant may have meant: indeed that the whole difficulty was only an "invention" of Kant's—*Guter Mut, halbe Arbeit*, says the proverb, and so apparently thought the learned Professor. Still we look at the matter from another point; happily it is not my business to explain the famous and dreaded chapter of the *Kritik der reinen Vernunft*—*Von dem Schematismus der reinen*

Verstandesbegriffe—I have only to show in the commonest outline those foundations of perception which later, in the artistic connection of the system, go to the greatest depths, and are therefore the subjects of the most secret exposition. "Unhappy is the speaking man," cries Emerson. "If I speak I define, I confine, and am less." This "unhappiness of the speaking man" Kant had to experience: still he would not consent to make his thoughts less, the crabbed genius of truth forbade it; and so they became dark, dark as the powers which rise in the growing life of the golden-cocooned chrysalis; he who does not call eyes and heart to his help will never understand this thinker and will never, freed from the darkness of the pupa, fly aloft with him on the wings of a new knowledge. But to-day, as I said before, our office is far more modest, and I am glad to be able to give the surprising assertion that we have achieved our task, and we now need only recapitulate it briefly, systematically, and with peculiar reference to Kant.

Descartes is of special value for the understanding of Kant because, with a striking resemblance in his intellectual aptitude in general, he has little capability and still less inclination to busy himself with the nice analysis of abstract comprehensions; that is why with him everything remains so concretely visible. That he insisted upon the critique of the human intellect as an indispensable foundation for all science is proved by a quotation at the very outset of this lecture; moreover the expression "pure reason" occurs often in his works;⁵⁷ yet whatever there is of pure metaphysics in his philosophy is rather symbolical than critical. Masterfully and forcibly he simplifies, and then he places his rough-hewn blocks as landmarks to show that he too has travelled through this domain, and then hurries on further to those scientific investigations which take complete hold of him. Still these somewhat rough-hewn symbols of

metaphysical knowledge have exercised an incomparable power upon later thought, as for example the distinction of every substance into thought and extension. Like an Alexander among philosophers he thus cut a Gordian Knot which all the desperate attempts of the spiritualists and materialists have never been able to join together again.

"Reason," says Kant, "proves its loftiest duties when it distinguishes between the world of the senses and the world of the understanding." Its loftiest duties! So great weight does he attach to this first and elementary direction of critical reflection! The senses and the understanding are in his view "the two extreme ends" of human knowledge. The shortest formula is as follows: "the business of the senses is to perceive, that of the understanding to think." More closely thought out, and more accurately analysed, it runs thus: our knowledge springs from two intellectual sources, of which the first is the reception of notions (receptivity of impressions), the second the power of appreciating a thing through the agency of the notion so received (spontaneity of conceptions); the first gives us the object: by the second the object is conceived in relation to the notion (as a mere diagnosis of the mind), and all this is rather an accessory, a preamble, a preparation, an exercise of the understanding in the intellectual nursery; the true depth of the Kantian method of perception is first attained when the philosopher reaches the certainty that the one "end" of knowledge (the senses) is incapable of the smallest result without the other "end" (the understanding). Unless the senses afford notions no thought can arise; and unless thought furnishes its directing power, no perception of an object can take place. Experience,—and in that word we express all that we are,—is therefore always "a product." If experience is always a product, then it would be simpler not to think of it as arising

and combined out of two different and separate origins, but rather as an original unity, which is only split into two component parts by analysis. Yet this objection is in reality very superficial, and all that it effects is the reopening of the door to insipid empiricism, according to which the understanding arises out of the senses, and to objectless mysticism, which makes the world of perception arise out of the reason or the will ; against which Kant at once admits that " the two stems arise perhaps out of a common, but to us unknown, root," while he declines to waste his strength upon this unknown and unknowable thing (unknowable inasmuch as it lies outside experience),⁵⁸ but at once declares that we possess no organ or power by which we can ever go beyond experience, and that in all experience the two stems are there, always capable of being proved to be distinct, and always postulated as united.⁵⁹

Kant is the only philosopher of experience—I wish to lay earnest stress upon that—he is the only strict philosopher of experience known to the history of human thought. That makes his greatness, and it is that which makes him so unapproachable to most people. To philosophise with Schopenhauer is a delight, not to say a luxury ; Kant, on the contrary, warns us with inexorable earnestness, " That the understanding of which the first duty is to think, should instead of that fall into extravagance, is something not to be forgiven." To philosophise with Büchner, Haeckel, and their like seems to comfort many brains that we may presume to be atavistically retrograde ; but Kant finds only one predicate, *impertinent*, adequate to the affirmations of materialism and naturalism, and he exclaims with loathing, " Whoso has once tasted Criticism, is for ever disgusted with all dogmatic nonsense." You must not be misled by that much-abused word Idealism. In my further lectures I shall have to offer a few remarks upon Kant's nomen-

clature ; here one word will suffice : when a critic of the *Reine Vernunft* described Kant's teaching as a "system of the higher idealism," the sage at once answered wittily and with fine solemnity, "For goodness' sake not *higher!* High towers and the metaphysically great men who resemble them, both surrounded by much wind, are not for me. My place is the fruitful depth of experience."⁶⁶

If you wish to know Kant's method of Seeing, if you wish to overlook no fundamental feature of his intellectual personality, then you must never lose sight of this famous saying, "my place is the fruitful depth of experience." This limitation brings into play at the same time a second fundamental characteristic,—that of unconditional truthfulness. The very same truthfulness which finds such crabbedly lofty expression in his moral writings rules here in the philosophic critique of human reason. And even this removes Kant far away from us, makes him inaccessible to most of us. It is not the truth that we long for, but lies : and lies are on the watch for us everywhere ; the lie invisible and unnoticed, like the bacteria and microbes, worms its way into our brain in the character of "suggestion," nests there and multiplies, until even if we were able to get rid of the intruder and its brood, we should still be unable to destroy its network without ruining our own power of thought. It needs not only extraordinary keenness of thought, but also extraordinary honesty of thought, and incorruptible love of truth, even a whole life of self-discipline, to fit oneself to the fact that our whole thought and being is surrounded by a brazen wall, and that we must resign ourselves to our fate, since we have neither wings to fly over the ramparts, nor the power of reaching the other side by burrowing under the earth.

From this strict limitation to experience we arrive not only at Kant's peculiar method of perception, but also at the special difficulties which many of his perceptions

present to our understanding. One word more in this or in that direction,—the least little strain exercised upon our thought,—what Kant calls experience,—and all difficulty would disappear. But Kant never makes allowances. “My place is the fruitful depth of experience!” I believe that I know that Kant may be called the greatest of all thinkers: yet I know with absolute certainty that he is the honestest of all men, and that this loftiness of character means the Sun under whose rays his mental work ripens.

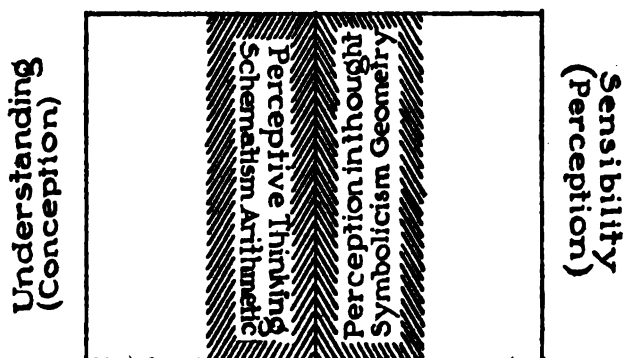
With all this you must be familiar if you wish to understand Kant's position in regard to the “twofold stem” of all human knowledge, and actually to know why he looked upon the world in this way and in no other. His iron law binds him to experience alone; he will neither dig for that “common root,”—always destined to remain hypothetical and perfectly incomprehensible, since we can only understand that which belongs to experience,—nor will he have aught to say to dreaming and Dogma. That is why he considers the twofold sense and understanding as double, and that is why the organism of the practical union of the two inside all experience can only be disentangled by the most painfully exact observation and critique of the facts of experience in the mental life. Kant is not concerned with being easily understood; what he is concerned with is spotless truth, above all with never overstepping the boundary of experience. Great is the reward! Kant is right: the bathos of experience is fruitful. What we learn here is inexhaustible, and it is not only true but useful. Kant's philosophy distinguishes itself *in toto* from all other methods of philosophy in this, that it watches over itself practically step by step; it is always directing itself towards two goals, natural science and moral doctrine. What can I know? What am I to do? Those are the two great questions which exercised

the sage of Königsberg. And what characterises him alone among all others is that in the answer to both questions he forbids any overstepping of the boundary of experience. Thence we see not only a Goethe but also a Johannes Müller leaning upon Kant, and thence to-day not only our most important and freest professors of philosophy, but in the same way many of our leading investigators of Nature, go back to Kant. Few have been adequately schooled to grasp Kant purely and fully ; but merely to touch the banner-bearer of crabbed, and at the same time energetic and richly active truth, suffices to ennoble all thought.

For to-day we must content ourselves with the standpoint of a Descartes who looked upon the last questions of philosophy rather from a psychological than from a purely metaphysical point of view. That the understanding and the senses are two is a matter known to us clearly and in detail by practical examples from the history of the Sciences. By seeing Descartes at work, first in the domain of the physical sciences, where on the one side the æther and on the other the laws of motion served us as main examples, and secondly within the narrower field of mathematics, we became aware of a tolerably complicated relation, which might otherwise easily have remained unknown to us. We discovered that between those "two extreme ends of human knowledge," as Kant called them, there lies a uniting middle land:—outwards the boundaries of this buffer-country are rather indistinct, while, on the contrary, the dividing line which runs through the middle, and separates the two halves of our intellect from one another, remains clear and sharply defined, even to a hair's breadth. We are taught that we must make our comprehensions evident to the senses, otherwise they remain empty : true : but what the understanding sees in making its comprehensions evident to the senses, is not that other "extreme

end," not the unadulterated perception given by the senses, but only a schematism of the senses, schemes which at their best reach the divisional middle line. We have to submit our perceptions to comprehensions, otherwise they are blind: to be sure, however, these conceptions must for this purpose be very essentially materialised, and the result is not pure thoughts, but a symbolism. It is then certainly no simple occurrence when we make our conceptions perceptible to the senses, and bring our perceptions under the category of conceptions.

The Middle Domain



Here is our ultraschematic diagram, ready to render us further service. If we were to direct our eyes simply towards the general division into understanding and perception by the senses, we should not reach far beyond Aristotle, who also in close connection with Plato distinguished the nature of thought (*νοητικόν*) from the nature of perception by the senses (*αισθητικόν*), and who consequently was like Kant and Descartes, antimaterialist and antipsychicist. The matter first gains a living interest, as well psychologically as metaphysically, through the discovery of the intermediary domain, and of the complicated phenomena which take place there. "Never

is a comprehension directly in relation to an object, but only to some different idea of that object." That was the one great discovery. It is amplified by the next : even if all perception of the senses brings to us something manifold, "we receive in the first place no objects of empirical knowledge, and therefore no experience" ; the rather does experience first come into being by the co-operation of a function of the understanding, since it is comprehensible imagination which brings into combination, "the many-sidedness of perception"—with that unity which is indispensable to all experience. There you have Scheme and Symbol. And I am convinced that you now accurately understand the whole matter at issue, since you have seen by Descartes' great thoughts of Inertia on the one side and the Æther on the other, what a Scheme is and what a Symbol is,—how each arises, what it means, and what are its limits.

I should like to remind you once more of Goethe's precious saying, "all thinking is useless for thought." True thoughts always come as it were of themselves, their birthplace lies just in that middle land where perception and conception join hands. And it is the same in the case of the understanding of the thoughts of another, where the chief matter of importance is far more the subjection, than any exertion, of the intellect. Kant himself warns us that "Insight cannot be forced and hurried by exertion." The man who wrinkles his forehead and draws his eyebrows together, will never make any progress. The expression of the true desire to understand is the widely open eye which shows how inwardly as well the mind greedily sucks up every ray of light in the one endeavour—to See. If you have yourself already seen what the other man saw and how he saw it, then his thoughts will automatically reach you. Hence, now that we are about to take a very decisive step, I repeat the petition which I have already made to you, to think

as little as possible, and see as much as possible. "In order to be comprehensible one must talk for the eye," says Herder in his *Reisejournal*.

You remember the first steps which we had to take in order to arrive at a comprehension of the boundary-land between the senses and the understanding. Here again Descartes helped us: we only needed to see him at work in the province of pure mathematics. Without the assistance of mathematics we should never have arrived at complete distinctness. But since without perception there can be no thought, and since almost all perceptions are of empirical origin, that is to say, arise through impressions from without taken up by our senses, so in the majority of cases the problem of experience is from the outset very complicated,—as we saw in the case of metamorphosis. You have only to examine our Scheme in order to convince yourselves how difficult it must be to ascertain the precise mental topography, that is to say, the exact place of an idea, which is forced upon us, given by perception, thought by conceptions,—but only thought when it is given, only given when it is thought. Such an idea has generally speaking no fixed place; it is shifted to and fro; the commutator of the middle land suddenly converts the one into the other, and e.g. what was in Goethe a pure intensive Symbol of the senses, in Darwin is converted into a perfectly artificial, abstract, logical Scheme. The advantage of mathematics was that we found there pure schematic thought and pure symbolical perception within our own mind and without any adulteration from outside. Hence the topography was perfectly fixed, and hence with mathematical precision,—as we may well say,—scheme and symbol corresponded to one another. The most important point which we gained from analytical geometry, was this, that the dualism of our intellect, expounded by Plato, Aristotle, and Descartes, but first accurately analysed by

Kant, is no matter of theoretical acceptance, but a mathematically assured fact. All Monism is a lie, not of course a subjective lie, nor a lie for those who are, or think they are, capable of soaring above all experience, still an objective lie, a lie so soon as Monism is to have value inside of experience. A gradual transition from perception to conceptions, or vice versa, from conceptions to perception,—an absorption of any sort,—is something which never takes place. In empirical experience there is still room for doubt ; the invisibly complicated relations lead to many a deception : Mathematics, however, teach us something better. We certainly shall never deny that



$$\text{and } R^2 = x^2 + y^2$$

are two exactly corresponding expressions ; but no unprejudiced man will be able to avoid feeling the artificiality and arbitrariness, I might almost say the tyranny, of such a proposition. Logic is powerless against it, for such propositions are outside the pale of logic : perception loses its rights in face of it, for perception is suppressed. The proposition possesses no trace of a meaning beyond the connection which I, as man, assign to it. That I have the courage of such a proposition does not prove that it has any objective sense outside of my own intellect, but only that there is a subject which is capable of uniting into symmetrical relation the two dissimilar parts of its intellectual organism. And it is just this construction of relations, not drawn from experience, but by means of which, uniting the two parts of our mind, we first make experience possible,—just as by the relations between

mental calculation and perception we make the higher mathematics possible,—it is just this that Kant describes by the dreaded, often used and seldom understood word “transcendental.”⁶¹

Mathematical analysis has here served us as an example; but I must ask you to make a careful distinction. It was the single man of genius who succeeded in setting up the equation $R^2 = x^2 + y^2$, and in endowing it with meaning; another man may introduce another equation with the same object. What is no achievement of ours, but is simply a fundamental law of the human intellect, is the fact that it is only the straight line that has the power to convert form into numbers and vice versa. Thus in our mathematical undertaking we were in reality bound to a transcendental principle, though we were hardly conscious of it. Now we must go a step further and enter upon the field where the arbitrary will of man has no voice, but where inexorable laws of our mind are the informing power—the transcendental laws of our reason.

In our schematic diagram we have left white the level spaces on either side of the hatching: these were supposed to represent pure sensibility and pure understanding. Now what Kant detects is as follows: the Symbol on the one side and the Scheme on the other, do not originate in the middle region, in transition and in combination, but all perception is at its very outset symbolical, and all thought is at its birth schematic. Although the commutation, although the switches which are to alter our direction may only exist in the middle domain, that is merely a matter of psychological insight: metaphysically, on the other hand, the knowledge that our reason is as a general proposition confined within Scheme and Symbol, is of fundamental importance. That is the transcendental fixed boundary of all that of which we are conscious as experience; Experience is never a pure apperception of what is and takes place outside our

human mind, but it is always a question of an experience which is schematised and symbolised. Almost all men, including our so-called empirical investigators of Nature, maintain that the human understanding possesses capabilities which are independent of scheme ; that is to say, that it is at any rate partially set free from the bondage of fixed methods of thought ; and they hold that human perception can equally see things as they are, and not as the tyranny of our one-eyed cyclopean form-sense of space transforms them for the benefit of mankind : but the man who maintains this doctrine is defending conceptions which are far beyond all experience, and indeed beyond all possible experience : that man is a dogmatist. Kant refuses to take this aeronautic flight : he remains prosaically, heroically, and recusantly on the terra firma of facts, and says : all human perception happens through the intermediary of a fixed Symbol—this Symbol of all pure perception is Space ; all human thought only moves within a perfectly fixed, limited, inevitable Scheme—this Scheme of all pure thought is the table of the Primary Conceptions of pure understanding, also called “Categories.”⁶² The fact that the conceptions of the understanding do not permit of being referred to any single conception (like Perception to Space), is one which, as you will see presently, is founded upon the essence of our intellectual mechanism ; but those conceptions do form a simple, strictly united scheme, acting on all sides as condition. We have, therefore, on the one side the one idea Space as an indispensable fundamental form of the senses, and on the other side the single group of the few pure conceptions of the understanding which make up an organic unity.

I should like briefly to limit and more closely define a saying of which I made use just now in order to serve as a support to your ideas, but which might possibly lead to misunderstandings later. I said : all perception

is at its very outset symbolical, and all thought is at its birth schematic: I should like you to grasp that not strictly, but only as analogy. You have seen how Symbol and Scheme arose out of the reciprocal interpenetration of senses and understanding; briefly, therefore, Symbol and Scheme are not original, but derived; but what space is according to Kant's conviction, that you can first and best imagine by the analogy of a Symbol,—what is the table of the comprehensions of pure understanding you can first and best imagine by the analogy with a Scheme—and now that the above reservation has been made you can fearlessly facilitate your entrance into Kant's world of ideas by the following formula: in the last resort all different symbols may be referred to one symbol, all different schemes of thought may be referred to a many-branched but yet single and united scheme. And these are Space and the Table of the Primary Conceptions.

This is a point which we may say we have reached with the help of the scope (*étendue*) and thought (*pensée*) of Descartes. But a mere lively perception is not enough; it must also be correct. And in order that your view of the world may be the same as that of Kant I will cite two short passages. First as regards Space. "Space is nothing more than the mere form of all phenomena of the outward senses, that is to say, the subjective condition of the power of the senses, by which alone outer perception becomes possible. Now since the liability of the subject to be affected by circumstances necessarily precedes all perception of these objects, we can understand how the form of all phenomena can be given in the mind before all true perceptions, and how they, as a pure perception in which all objects must be fixed, are able to contain principles of the relations of the objects to one another before all experience." It is a little more difficult to find words for the pure primary conceptions

of the understanding,—words which, without a previous exegesis of the Kantian system, should be directly intelligible and yet express a great deal,—perhaps the following might serve the purpose. “Just as space implies the condition of perception in a possible experience, so are the Categories nothing more than the conditions of thought in a possible experience; they are forms of thought which imply the power of uniting into one consciousness the Manifold which is given in perception; and since experience is knowledge by perceptions linked together, so the Categories are conditions of the possibility of experience.”⁶³

If you have paid attention to my request not to cramp your thought in a narrow gangway, but rather to yield yourselves openly and without reserve to a new method of perception, you surely will have succeeded in following me so far. Of the utmost importance are two notions which are easy to retain. Space is the necessary form, the Symbol, of all phenomena: the uniting of that which is manifold in experience into a single consciousness takes place by the intermediary of an immovable Scheme of thought. The little which remains to be said will offer no difficulties if only you never for a moment turn away from the principle of the perceptible incorporation of thought.

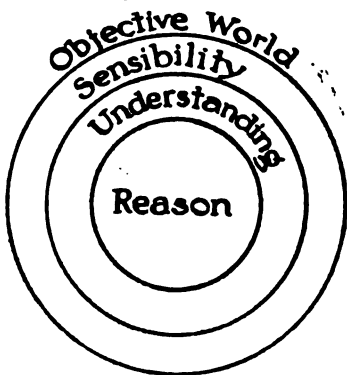
As you will have gathered from his words, Kant believes in a condition of the power of the senses and in a condition of thought: it is the interplay between these two conditions that gives birth to “experience.” And we may be sure that this conviction of Kant’s does not rest upon logical system-mongering, but, quite on the contrary, on precise analytical observation of the functions of the mind; his method is, as he says himself, “imitated from that of the investigator of nature.” It is here important in the first place to remark that, even if all the power of the senses is subjected to one condition—extension in space

—it is still the one thing which brings about the manifold in nature, whereas, on the other hand, it is the prime function of the many-branched understanding to bind his multiplicity into unity. Beyond the power of the senses,—it is impossible not to premise this—lies the objective world, a real chaos of multiplicity: on the hither side of the understanding lies—nothing! nothing but a unity, that unity which Kant calls Reason, and which is familiar to us as the true *ego*. According to Kant, moreover, there is, as you see, a progressive simplification and unification. Here again a schematic diagram will render us preliminary services. Think of the limitless objective world outside a circle.

It is from that world that the senses take their impressions, and that too under the strictly simplified law that they force it by the compulsion of a single form, that of extension in space, to what, if I might so call it, is a "simple multiplicity." Then the understanding reduces this multiplicity to a few primary conceptions standing in relation to one another, and these primary conceptions coalesce in a consciousness of their unity which might be called Reason. In this way the circles are packed the one within the other.

Here there are two things deserving of special attention: first the peculiar intermediary position and function of the understanding, and next the special relation of the inmost circle (Reason) to the outermost circle, that is to the surrounding world.

Further in the way of simplification perception cannot go, inasmuch as it brings all the impressions under the



one form of extension ; on the other hand, the understanding, if it were to proceed in the same fashion, would bring up no further simplification, but only a reflected image. For simply thinking as a merely formal conception, while it no doubt leads to the idea of oneness, can yet embrace all multiplicity : for example, to the mathematician the number 1 means the " infinitely great," and the single " type " of the zoologist can embrace a boundless wealth of forms. The conception " unity " gains a living meaning only when used to distinguish the idea of organic combination as opposed to mere formal fusion ; as soon as the one conditions the other, by which in its turn it is conditioned, the two together form a true unity. True organic unity can never arise out of singularity, but only out of plurality. That is why the essence of thought is systematic organisation, dissection, conjunction. You cannot think without passing judgment, and you cannot pass the simplest judgment,—for instance " the room is big"—unless you are in possession of three several conceptions, the subject, the predicate, the copula. Each of these three is derived from a special primary conception, *substantia*, *existentia*, *multiplicitas*. The leading simplification, carried out by the senses, is violent and coarse like the first preparation of some material, like the dressing of yarn ; it is only later that the threads are woven into an organic unity. There must, therefore, be numerous primary conceptions, otherwise it would be impossible to introduce order, connection, unity (and that means sense) into the mass of impressions which are afforded by perception. Kant writes, " Combination does not exist in the things, and cannot be in any way borrowed from them, and so, in the first instance, be taken up through perception into the understanding,—but is a function of the understanding which is of itself no more than the power to combine and to bring into unity that which our senses give us as

manifold." That is a memorable saying. Our understanding is a power to combine and to reduce that which is manifold into unity.⁶⁴ It will be understood moreover, I hope, that the multiplicity of conceptions in the face of the unity of the form of perception means a progressive unification, and that without this "wholesale conjunction" there would be no such thing as knowledge, nothing but chaos, or as Kant puts it, a "rhapsody of perceptions." (R.V. 495.)

The second condition which here deserves your attention is the intimate connection between the innermost circle and the outermost. The ego and the world stand in reciprocal interchange: each is necessary to the other: neither can be grasped, seen and dissected except so far as it is reflected in the other. The powers of the senses and understanding hover between two Unknowns: the one immeasurably great, the other without any magnitude, without space; the one imaginably rich in an inexhaustible multitude of forms, the other completely devoid of form, and for that very reason unthinkable. If we consider the relation from the standpoint of perceptibility, then we must say with Kant, "the world is the sum total of all phenomena" (R.V. 391), the ego, on the contrary, "the poorest of all ideas" (R.V. 408, 404), indeed "an idea empty of all contents." Still, if we pursue the matter conceptively we discover that the "world" is really only an idea, an image in the *focus imaginarius* such as we made acquaintance with in the first lecture, an image projected out of the ego into the Inscrutable.⁶⁵ And so the two stand over against one another as correlatives: without the world no ego, without the ego no world.

It is, of course, impossible for me to engage in a more searching discussion of this subject: but it will be worth your while to follow up the lead which I have given. Later on you will find in Kant the most fascinatingly

deep amplifications of the matter. My object for the moment has been above all to show accurately the twofold boundary of experience, because that is so essential to Kant's method of Seeing. I spoke a while ago of a wall, and said that Kant's principle was to confine himself within this boundary of experience. But there are indeed two walls. One wall inwards, and a second wall outwards, and it is the intervening space to which Kant confines himself as the only space of experience. And here again is something of which you must possess an exact and comprehensible idea, otherwise the next thing will be that you will once more fall into the clutches of the all-wise dogmatists, and will lose the moral and intellectual greatness as well as the scientific certainty of Kant's renunciation. It is manifest how empty is the purpose to try and solve the great riddles of existence, out of a nature which is of our own creation, of which the necessary laws are the laws of our own understanding : but Kant will tell you that the opposite proceeding is exactly as deceptive. There is no ego of experience which might serve as a foundation, upon which to raise a dogmatic erection either of the comprehension with Fichte and Hegel, or of the senses with Schopenhauer ; the ego lies beyond, or, if you prefer it, on the hither side of, experience. You will see more clearly from the juxtaposition of the two following short formulæ than from long arguments, the yawning gulf that separates the schools of philosophy ; Schopenhauer teaches us that

The world IS MY idea.

Kant says—

MY WORLD is idea.

The difference is immense. For the one is a monstrous, indeed, if you look closely into it, a mad Dogma which presupposes Nature and the ego as peculiar existences, and then sets up categorical conclusions as to the relation

between them : the other is the simple affirmation of the result of critical reflection within the boundaries of experience,—a reflection which teaches that whether inwardly or outwardly we are concerned with nothing except Symbols and Schemes, so that we can make no pronouncement about a " world " beyond the fact that we human beings are compelled to imagine one. Besides this there results from Kant's doctrine the significant inversion, I am an idea of the world, a fact upon which Kant never wearies to descant, since this is really what is contained in the otherwise empty ego. Whereas from Schopenhauer's fundamental doctrine there is no result beyond the necessity of inventing a second dogma in addition to the first, which is what happens with the dictum " I am Will."⁶⁶

But now and in conclusion there still remains a question for us to examine, which equally moves entirely within the frame of Descartes' philosophy and of the material for ideas which we have gained in the course of this lecture. With this object let us return to the region of experience and to our old Scheme, which I shall furnish with new terms, for now we shall look upon the matter " objectively " instead of " subjectively." Understanding and the power of the senses have been considered as functions of the human mind ; instead of that we will now take into consideration that which corresponds with those functions, so to speak, as object. Where before we wrote " the senses," we now write " space " ; where we wrote " understanding " we will now write " the primary conceptions of the understanding." But what are we to write in the hatched middle space ? We learnt from the history of sciences, and specially from analytical geometry, that no transition takes place from the one side of the middle line of separation to the other except violently, suddenly, and through transcendental encroachment. That will clearly be the case here, for if in mathematics we were

dealing with quite pure, that is to say, quite human, ideas and conceptions, we have now risen a step higher : we have here space as the primitive form of all possible perception, and the pure conceptions of the understanding, or categories, as the all-embracing primitive forms of all thought. What is to take the part here which mathematics played in empiricism ? Where shall we find a transcendental commutator, a transcendental straight line ?

Before answering the question I must call attention to another trifling matter, because it will help towards the clear setting out of the problem. Everybody without exception finds it much easier to understand Kant's doctrine of space than his doctrine of the pure primitive conceptions of the understanding. Of the readers of the *Reine Vernunft*, perhaps ninety per cent do not get beyond the first part, which treats of the form of perception (space). And that does not happen, as one might imagine, because it is easier to understand that which is perceptible than that which is abstract. On the contrary, it arises from the fact that it is easier for a man to follow a logical demonstration than to accustom himself to a new and strange method of perception. It is from out of the understanding that space is contemplated, and therefore it is, as our first Scheme shows us, a "perception of thought," or if you please a symbolical thought. For that reason the argument can be presented in almost pure logical form with firstly, secondly, thirdly : nothing remains hazy. But the categories, on the contrary must, if we wish to understand them rightly, be approached from the side of the senses, that is to say, we must contemplate them as Schemes, and yet see them. Pure conceptions of the understanding cannot be further analysed and explained in terms of logic, for they themselves are the simplest elements of thought : a subject which can only be grasped by perception, defies all definition. You may define space, but you cannot

define the single pure primary conceptions of the understanding, at any rate not logically. The name "space" expresses something fixed; whereas all names for primary conceptions are mere helps in need, only, as it stands in the *Dissertation,—cognitio symbolica*. (D. § 10.) The name substance (or stability), for instance, is nothing but hocus-pocus until you learn to understand that we are here face to face with "perceptible thought," a pre-logical thought, a thought lying on that middle territory where conceptions are first born of the union with the senses. The same observation applies to causality, reality, etc. Here, standing as we do upon the two topmost rungs of the two ladders, I can only see the one when I take my place on the other. That is the one great, perhaps the greatest, difficulty against which Kant has to fight, and a chief cause of the much complained of "darkness" of his philosophy. If the primary conceptions of our human thought were abstract, self-reliant thoughts, we should in any case be able to talk about them; but they are nothing outside their relation to the power of the senses: that at any rate is Kant's view, and that is the reason why nobody by mere thought and without joining with it active ideas, can grasp Kant's real meaning upon the subject of the primary conceptions. He says, "the categories afford us no knowledge of things excepting by their possible application to empirical perception," and hence "we cannot really define any single category without having recourse to conditions of the senses, therefore to the form of phenomena to which they must consequently be confined as their only objects, because if this condition is removed all significance, that is to say, relation to the object, falls away, and it is then impossible for us by any example to make ourselves grasp what sort of thing is meant by such-like conceptions." (R.V. 147, 300.)

Here again I am forced to content myself with a mere

suggestion : but you will very soon realise what is the purport of this reminder.

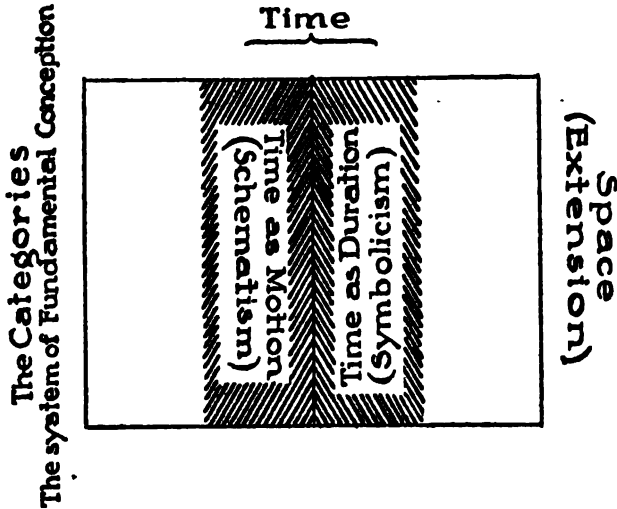
Supposing then that the primary conceptions of our understanding existed without any relation to the senses, it would be impossible to see how the requisite " application to perception " could take place, and our knowledge could in no case be a " knowledge of things " : it would be at best a " cloud-cuckoo-town " * knowledge or, as Kant puts it, a too ambitious knowledge. It would be just the same as if we imagined a mathematical proposition, purely logical, incapable of being turned into anything perceptible, a calculation with an unknown x, y, z , in which everything would naturally fit in correctly without conveying the slightest meaning. And the same holds good, though of course in an inverted sense, in the case of space, as to which we have already seen in Newton, that thought cannot easily grasp it, and yet loves to busy itself with it. And you will understand me when I maintain : that that " transcendental straight line " of our research, which is to serve us as a commutator between the primary conceptions of thought and the primary form of perception, must not only, like mathematics, be at the same time perception and thought, but must turn its perceptive side to thought, and its thinking side to perception.

These are conditions which Time alone can fulfil.

Time is at once conception and perception ; Kant introduces it sometimes as the one, sometimes as the other. He calls it " Inner perception," or " Form of inner perception," but then again " Form of the inner sense."⁶⁷ However you look at it, it always remains something " inner," because like its empirical embodiment, mathematics, it fills the inner or middle domain. And yet it is in so far something " outer " as it serves to transport each of the two fundamental functions of our

* See the " Birds " of Aristophanes.

knowledge out of itself and into the other form. " The conception of change, and with it the conception of motion as change of place, is only intelligible through and in the idea of Time ; unless this idea were perception



(inner perception) no conception, whatever it might be, would make the possibility of a change comprehensible."⁶⁸ It is only in Time therefore that a world can exist for us. That is one side of the question. On the other side it is precisely Time that gives us the idea of stability, and as such the form of the perception of ourselves and of our subjective condition. For, as Kant says, " Time can be no definition of outer phenomena : it belongs neither to form nor position, etc. ; on the other hand, it does define the relation of ideas in our subjective condition."⁶⁹ Without Time, then, no Ego ! and not only no Ego, but generally no conception of substance, that is to say, no idea of any object which remains stable in the midst of all change. We have to thank Time for motion and stability, for development and being, for World and Ego.

The analogy with mathematics must strike you at once : and you will perceive that in our new Scheme we have placed our indications on their proper sides ; for Time as stability manifestly corresponds with Geometry which is mathematical form, while Time as fluent motion is the foundation of the conception of numbers.⁷⁰ It is true that time as stability is not form, but it furnishes the commutator, the salient point at which the idea of stability arises through the transcendental union of understanding and the power of the senses, that is to say, of space and conception. In the same way the logically unthinkable conception of a change of place in space is impossible without a similar intermediary position of Time.

Let me go more closely into what I have hinted at. For the function of Time must be made clear to you without any reservation, and it can be made so if you will only take Descartes' analytical geometry as your counsellor step by step. Descartes would have been unable to carry out the critique of the human intellect as Kant did, and yet in the practice of his method of thinking he has shown a manner of Seeing which is in complete harmony with that of Kant. The part played in Descartes' mathematics by the straight line, is played in Kant's analysis of the human intellect by Time.⁷¹ As you will remember, the straight line is not form, inasmuch as it is the only visible thing which gives birth to no form ; and it is not a number, inasmuch as every straight line can represent every possible number, and therefore remains entirely indifferent to the conception of numbers : and in spite of that it alone furnishes a footing for the conversion of form into numbers and vice versa. It is just the same with Time. It lies altogether outside of the true conceptions of the understanding ; it also lies outside of all perception. Time, as we said before, is at once conception and perception ; now we will speak with

greater precision and say: Time is neither perception nor conception, but can never be far removed from either; that is to say, without Time we can neither perceive nor conceive. That is why Kant calls Time "the constant correlatum of all existence." (R.V. 226.) Space too is "no real object which can be outwardly perceived," but is "the very form of phenomena" (R.V. 459), and indeed in the famous dispute as to whether it was possible or not that there should exist an empty space,—in which Descartes with unerring genius took the part of the impossibility, Newton with the childish simplicity which was peculiar to him asserted the certainty of this monstrous idea,—our abstract jingle of words is based upon a perception which is at least imagined. Time, on the other hand, offers no handle to perception, for where we conceive it as extension and quasi-visible, that happens by means of an allegory inasmuch as we draw a line in our thoughts and analogically use it to represent Time, which "outward figurative idea of Time" Kant has discussed in detail. (R.V. 154, seq.) Neither has thought any more power of comprehending Time; it always contrives to elude thought. St. Augustine with a sigh says, *et confiteor tibi, Domine, adhuc ignorare me quid sit tempus.*⁷² The old Greeks had already discovered that Time could only exist for the thinker who measures and counts its hours, and Descartes, who has no objection to predicate "lasting," that is "stability," of things, gives it as his opinion that *le temps n'est rien qu'une façon de penser.*⁷³ And yet the measures of time deduced from various motions, such as those of heavenly bodies, for instance, do not correspond to the actual lived or living life of a man: for him a minute may contain years, years may glide by unobserved like a short autumn morning: he measures Time not by length, but by gradation, that is to say, by the sensations which it contains. Here there is no possibility of bridging over the gulf, our double nature asserts itself too abruptly.

If ever you study Kant's *Reine Vernunft* you must not linger too long over the preliminary doctrine of the senses; for here unfortunately Time is at first dealt with as if it belonged to space, and indeed to space alone, and that means, therefore, to the power of the senses. That has given birth to a misunderstanding widely spread and disseminated by Schopenhauer into the remotest strata of the imperfectly cultured, by which Space and Time are represented as two forms of perception of equal value and parallel to one another. To talk of the "ideality of Space and Time" has become a commonplace platitude; and yet we have to deal with two completely different things: Space is the only form of all pure perception; Time is an intermediary between perception and understanding, which in itself and by itself can neither be perceived nor imagined. That is why I recommend you to hurry on further through Kant's work, till you reach the place where it will be shown to you how the conjunction between understanding and the power of the senses (i.e. between the primary conceptions and the idea of space), takes place. Here you will once again meet Time introduced as a twin-sister of space, but as precisely in the same relationship to understanding, and so "as an intermediary idea, on the one side a matter of the intellect, on the other of the senses"; on the one side "similar to the category, on the other side similar to phenomenon in so far as Time is contained in every empirical idea of the Manifold." Then will Kant's perception for the first time really become clear to you. Time is an intermediary idea, on the one side belonging to the intellect, on the other to the senses: what that means you now understand thoroughly and in detail. You need only think of the analogously intermediate part which the straight line plays in mathematics; and you will see clearly how important such an intermediary is for our whole intellectual life, if you remember from the

history of our sciences which we touched upon at the beginning of the lecture, that nothing which has been observed can be thought without the intermediary of a Scheme, and no thought can gain any constructive value without the intermediary of a symbol: Time is the foundation of all these intermediary processes. And now if you look at the title of this chapter of the *Reine Vernunft*, you will discover with amazement that this chapter so impatiently awaited because it is the most indispensable of all, the one by which at last the goal is reached, this brilliant solution of riddles, the famous, dreaded chapter decried as impenetrably dark, of which I spoke at the beginning of this passage, is the chapter on "the schematisation of the pure conceptions of the understanding." And I think you will ask with me, what sort of perception can there be in the brains of a professional, state-paid commentator on Kant, who singles out this chapter to condemn it as valueless?⁷⁴

That, however, is a matter of indifference. If Kant himself in the chapter in question asks, as he does literally, "How is it possible that pure conceptions of the understanding can be applied to phenomena?" we cannot but think him fully justified. As he says, "It is clear that there must be a third." We too see that clearly. And when after proving that this "third" must be Time—a demonstration of the all-conquering power of conviction—he goes on to show that the combination of the "first" and the "second" which takes place inside this "third" is no fusion, but nothing more and nothing less than a "placing of the two together in relation to one another" by intermediation; and when he calls this intermediation a Scheme, and consequently makes the relations of the primary conceptions of the understanding to the nature of our impressions of the senses, take place through the intermediary of a schematisation of pure understanding;—then all this is perfectly clear and

natural and according to expectation; we knew it already from empiricism and mathematics: what is new to us is at most the fact that this relation is fundamental in all human knowledge without exception, since it is that which gives birth to what may be called Experience. In my humble opinion there is only one thing lacking to make Kant perfectly clear: that is to say, a chapter upon "the symbolism of the pure power of the senses." Not that I should wish to obliterate Kant's distinction between spontaneity and receptivity, between function and inclination, between activity and passivity,⁷⁵ as characteristic in the understanding and in the power of the senses,—for mathematics and Time itself teach us, as Kant himself has done, that we not only comprehend our perceptions, but also perceive our thoughts, and that both these processes, not one alone, take place through the intermediary of that "third." Because Kant at the beginning of his critique lays stress upon a one-sided view of the relation of Time to Space, the reader is taken by surprise when he finds it brought into an equally close relation to the comprehensions of the understanding, and described as "a third"; and next the first one-sidedness is amplified by a second, since now he only lays stress upon the schematic intermediation of Time, therefore, to use Kant's expression, upon the way in which the power of the senses realises understanding, not on the way in which the understanding realises the power of the senses, that is to say, the symbolising activity of Time.⁷⁶ Yet there can be no doubt that we have correctly represented Kant's perception: the whole *Kritik der Reinen Vernunft* and that of the *Urteilkraft* (power of judgment) bears witness to that; Kant may have had good metaphysical reasons for his inconsistent exposition—indeed, he certainly did have them, though they have not come under our observation here. We have only been dealing with his method of Seeing, and of the many

proofs which have been laid before you, I need only remind you of one, which furnished the clue to the whole examination of Descartes : " Thoughts without contents are empty, perceptions without conceptions are blind. Therefore it is just as necessary to make our comprehensions obvious to the senses,—i.e. to add to them the object of perception,—as to make our perception comprehensible to ourselves,—i.e. to subject it to comprehensions." To bring one's perceptions under conceptions is called Schematising: to make conceptions obvious to the senses is called Symbolising. Neither can take place except by one and the same intermediation, that is to say, through a single element essentially unified, even though it should appear iridised in two colours,—otherwise no unity would exist in the understanding—that transcendental unity, which arises in consciousness by the combination of Scheme and Symbol. Time is that commutator. Precisely where the middle line separates, there the two-sided " commutation " takes place, the conversion of the one into the other. We saw it in mathematics, we saw it in the empirical sciences, we shall be aware of it in every single one of our thoughts, as soon as we have been attentive and have learnt to appreciate the indispensable intermediation of the Proteus Time.

One thing must be fixedly borne in mind, that for Kant, Time, like mathematics, is a purely formal principle. For that reason and because its special function is combination, therefore it is present everywhere, in every thought and in every perception. In order to communicate my comprehensions to the senses, I need Time: in order to make my perceptions comprehensible, again I need Time. Two examples: the Æther is little more than the vanishing thought of stability hardly felt by the senses: the observations on motion teach us that the same point may be in two places, which would have

no sense for pure understanding, unless the drawing of a line of Time made it thinkable. Even so Time can nowhere, neither in thought nor in perception, be grasped otherwise than as something existing for itself. Thought and perception cannot exist apart from Time, yet Time is nothing apart from its relation to thought and perception; its essence is to be the fundamental relation of all relations, that through which relations as a general principle arise and have their being. Everywhere the strict analogy with mathematics! and therefore for us the relatively easy mastery of an otherwise so difficult, so incomprehensible subject.

If you wish briefly to sum up what twofold Time has achieved on behalf of our knowledge you may say: since Time as Stability is the means of subjecting the manifold power of the senses under the yoke of the conceptions of the understanding, it bestows upon that power Unity: inasmuch as Time as Motion combines the unity of the inner sense (i.e. the unity of Reason) with the power of the senses, here it bestows manifoldness.⁷⁷ Two examples: Kant has shown how every one of our primary conceptions, magnitude, gradation, causality, reciprocal action, reality, necessity, etc., grasps the matter of perception by the intermediation of a Scheme of Time, and draws it together into unity;⁷⁸ on the other hand, Kant has also shown that every affection of the senses can only be perceived as motion, from which he draws the definition, "The fundamental principle of a Something which is an object of the outer senses must be Motion," and motion equally demands Time as a correlative, and can only by the intermediation of Time give manifoldness to thought. And now at last the knot is tied fast, since understanding assimilates motion, and produces perfect Scheme, while perception takes causality, reciprocal action, necessity, and other pure primary thoughts, and amalgamates them so completely with

that which has been observed, that it almost fancies that it can see them with its eyes.

We too must tie a famous knot to end this long and laborious lecture. You remember how as a condition for the understanding of Descartes' special talent we set up the formula that he knew how to make the invisible visible, and the visible invisible. How far this formula is applicable to Kant you now know too accurately for any further explanation to be necessary. The saying, put so simply and abruptly, has but little significance if it is used in connection with Kant's rich world of thought. Still, even so it can render certain services in this direction. That the invisible comprehension is powerless till the actual visible object has been offered to it by perception, and that, on the other hand, this same perception remains blind, unless comprehensions transfer this visibility into the invisibility of the world of thought—this, combined with the doctrine that it is Time which schematically and symbolically cares for the hither and thither of the transformations: this it is which taken together makes up the essence of Kant's perception in regard to human knowledge. Now the limitation to experience, forms, as you will remember, an indispensable part of this perception of Kant's. What we see are only appearances due to the two-fold conditions of Form of the Senses and Schematisation of the understanding: and if we add "the third," Time, the conditioned phenomena become threefold. As for the things themselves, and what may be their essence, we have neither the disposition nor the possibility to form an opinion, and it is just such a riddle that the individual remains to himself. Yet we cannot prevent two powerful ideas from growing out of this experience of ours, however strictly we may imprison them within their double rampart:—the World and the Ego. We have already spoken of this, and I will only add that World and Ego are as it were the two ends of the knot that I have in

view: the Visible and the Invisible *κατ' ἐξοχήν*. The World, the visible end, is nothing else but that threefold conditioned phenomenon in its highest, all-embracing potentiality, the symbol of all symbols; if I remove the Ego to which it appears, nothing remains, nothing, that is to say, that would have any possible meaning for us men; for it is only the Ego that can bring forward the idea of the World. Yet the converse holds equally good. The Ego can be neither thought nor perceived unless it be mirrored by the World; if I remove the World, the Ego, the Inner thing, fades away. What remains is an empty Scheme of all Schemes, that is to say, a Nothing. Here too there is an interchange, and we can tie a knot as we bend the Inner outwards, the Outer inwards. Nothing hinders us from conceiving the Ego as the invisible World, the World as the visible Ego. That we are accustomed to look upon the senses as outer, the understanding as inner, is after all nothing more than a convention, than a superficial analogical deduction from the organs of sense and the brain in the bodies of the vertebrate animals. The diagram on p. 289 might just as well be reversed; reason or the Ego the all-embracing circle, the World in the inmost circle.

In this way do relations complicate themselves as soon as we cease to limit ourselves to the domain of experience. This limitation, however, is not always possible. We cannot simply go to the order of the day about Ego and World, about Soul and God. And so many an idle chatterer, and also many a noble man, and among the latter none bolder than Giordano Bruno, has soared aloft upon the wings of fictitious knowledge, in order to solve the riddle of the world and the riddle of his own being outside the boundaries of experience. In what a different spirit Kant set to work upon such questions, you will have suspected from our work to-day, and you will guess that he must also have reached different results:

hope that this will show itself fully as a result of a comparison with Bruno. In his case, as in that of Descartes, we have to deal with a specific thinker, and yet their attitude towards the material at issue is almost directly opposite: for whereas Descartes only exercises the critical function in the domain of knowledge as a discipline of limitation in order to be able to devote himself in safety and freedom to empirical observation, and to the hypothetical and theoretical significance of concrete Nature, Bruno lives only in the empyrean of abstraction and speculation, and accredits human reason and its logical inferences with all knowledge and all power. That is why he has to take up an essentially different relation to Kant. In order to promote the interests of our investigation we gave precedence, whilst dealing with Descartes, to the similarity with Kant, leaving unnoticed the points in which they differed; in Giordano Bruno we shall, on the contrary, gain our brightest illumination from the points of difference. And so we shall let our day of empiricism and the critique of experience be followed by a morrow of dialectics and dreams.

BRUNO
CRITICISM AND DOGMATISM
WITH AN EXCURSUS ON THE HISTORY
OF PHILOSOPHY

Upon the boundary between time and eternity, between primeval representation and single creatures, between the world of thought and the world of the senses, sharing the essence of both, and, as it were, filling the gap between the ends which fly apart—set up upon the horizon of Nature—stands Man.

Giordano Bruno.



BRUNO
From an old engraving

are fed by phantasy, and phantasy in its turn is fed by nature; the man whose mind is turned actively outwards, will possess a rich inner store of ideas, and with them food for daring dreams: still, dreams of that kind depend upon reality, whereas the true dreamer in the usual popular acceptation of the word, busies himself less with reality itself than with his own thoughts about it, and looks upon these thoughts as the most real of realities. While a Descartes looks upon his own thought as he would upon any obvious phenomenon of nature, and pursues his anatomical studies of the brain in the hope of discovering special organs of memory, of judgment, and so forth,—a Bruno is rather inclined to mistrust the evidence of the senses—*il senso non e principio di certezza*—and to presume that truth exists only in Reason and springs from the fire of dialectical argument.² This last mode of thought, the purely scholastic, is one which we have not yet come across in our lectures; for neither Goethe, nor Leonardo, nor Descartes is concerned with it; and I think we shall learn much that will be new to us about that which is distinctive in Kant's intellectual personality, if we compare it with this scholastic mode of seeing and thinking. For it is a certain fact that Kant was a specific thinker, a man who, like Bruno, devoted the greatest part and the best powers of his life to investigation by means of thought, and that so far he too might be called a schoolman, and so appears to belong to the same group as Bruno; and yet in spite of that Bruno is further removed from Kant than Goethe, and Leonardo, and Descartes are. Here, therefore, we are compelled to have recourse to analysis, and in accordance with our principles this analysis must rest upon perception and not upon the abstract: we must always use our eyes in the matter: otherwise we cannot be sure whether we are thinking thoughts, or merely stringing words together. We must, however, carefully consider how we are to

go to work in order to arrive at a perceptible side in the scholastic mode of thought. Here we must less than ever be afraid of taking the long way round if it will but lead us to this desirable result. I think that what I have said about the dreamer, and the briefly sketched distinction between the dreaming of a Descartes and the dreaming of a Bruno, are well fitted to guide us in the right way.

As a matter of fact, in every philosophy involuntary dream-shadows play an important part: without them no philosophy can come to anything. These dream-shadows are certain general forms, peculiar from the very outset, springing out of the inborn nature of the intellect of every thinker; and even though their possible individual combinations may be so inexhaustible both in numbers and variety that it would be ridiculous to believe that the one personality and its thoughts could in any way be satisfactorily characterised by being drawn up into a Scheme,—still, by comprehensively and keenly observing the phenomena, we may be able to refer the possible primary forms of philosophies to a few heads, just as we are able perspicuously to comprise more than a million forms of animals in eight or nine clearly definable types. Indeed, I believe that some such investigation of the possible principal aims of all human philosophies, thought out according to the principles of natural science, with systematic classification, would be an indispensable complement for every history of philosophy: for while the essence of all history is the giving prominence to that which is conditioned by time, the stress laid upon that which is necessarily eternal constitutes the essence of true science.

I should like, therefore, at the outset of this lecture, to introduce the analytical excursus which will give us a general view of abstract things. I promised you a day of dreams: many dreams will pass before you, and you

must not be impatient if sometimes we seem to go far astray : I shall never for a moment lose sight of the goal. And if we reach so far that we are able clearly to distinguish the various specifically different myths and dreams from one another, then the comparison between Kant and Bruno, which is no exposition of doctrines, but an exact comprehension of personal intellectual aptitudes, will be easy to effect quickly and surely ; and I hope that it will be of great service to us, since it teaches us to distinguish with perfect clearness and sharpness between Dogmatism and Criticism. You will henceforth see how Kant, and with his exception Plato alone, stand upon a different footing from all other philosophers. You will seem to be crossing over from one world into another, and that other world is nothing more than the world as Kant viewed it.

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In the dream of sleep there arises a medley of what the eyes have seen by day, and of the discoveries of our free thought : each of these two elements is inseparably joined to the other : without the fusion of the two no dream could occur. What takes place here in the passive function of the brain of the sleeper, recurs at every step of intellectual potentiality. The whole life of thought is, as we showed in detail in the previous lecture, a *product*, that is to say, the result of at least two components : and here, as Aristotle taught us (see p. 101), we can always distinguish between an "activity" and a "passivity." But nowhere does this manifest itself so clearly as in that extreme object of comparison with the dream of the sleeper,—the fully conscious, creative philosophy of important intellects. What in the one we called dream, we may here call myth : dream and myth are intimately related, as you will have many opportunities of seeing more exactly in the course of to-day's lecture.

Aristotle rightly derives all philosophy from the invention of Myths, and pronounces it as his opinion that every Philo-Mythos must of necessity be a Philo-Sophos,—that is, whoever views the world in the sense of the myth, will be able to think of the world in the sense of philosophy.³ To be sure, Aristotle regards that as nothing more than a first step, and he looks upon himself as having quite outgrown the myth stage, and as having reached the positive final truth ; and yet to-day we all smile at the simplicity of the great man whose views of nature swarm with demonstrable blunders, so that no natural science was possible until his fatal authority had been broken down. The man who soars high enough will perceive that Aristotle simply replaced one myth by another, just as later the Aristotelian myths were crushed by other new ones,—since absolutely no philosophy, however empirical it may be, can dispense with myths, not only as helps and stopgaps here and there, but as a fundamental element pervading the whole. We are not all possessed of Aristotle's keenness of intellect, and if we see philosophy growing out of the myth which is akin to the dream, we still all incline to the Aristotelian simplicity, and believe that the myth has at last been conquered by science,—whereas, as a matter of fact, the investigation of Nature has only resulted in the multiplication of Myths.

It is only the so-called " positive intellect " which can content itself with few fictions, and is proud of it : but what distinguishes the positivist is not that, as he imagines, he is living in pure " reality," but, on the contrary, that he contrives to get on with a minimum of " reality " ; he takes his stand upon the domain of indifference, in the inner middle space between empiricism and reason, perception and thought, dream and fiction, so that all impressions and intellectual impulses are reciprocally neutralised in him, and that all that which

has been so bountifully bestowed upon us men emerges as *summa summarum*, Zero. Apart from this pseudo-vegetative filling of maw and purse, called positivism, men are all dependent upon myths, as much to-day as they were thousands of years ago. And this because doubleness, twofoldness, is a fundamental phenomenon of the human being, and because we have no other means of bridging over the gulf between perception and understanding, between nature and the Ego, than by myths more or less consciously invented or dreamt. I set that out now without further explanation, because you have already seen in the previous lecture that we are always forced to schematise our perceptions and to symbolise our thoughts, without which we should have neither perceptions nor thoughts. Our whole thought-life is based upon a violent and, so to speak, artificial activity. In the meantime it is enough that I should have called your attention to the gulf which is present everywhere, and to its bridging over by the Dream-ideas of man. This bridging over, when it exists in the largest, most comprehensive sense, with a view to the creation of a unified world-picture, is a myth.

The myth, this conscious waking dream, like the dream of the sleeper, has always a double root. On the one hand it grows from contemplation of nature, while on the other hand it springs from man's reflections upon his own Ego. The myth is therefore not only a picture but also a thought ; it contains an element of the senses as well as an element which is not of the senses. How right Aristotle is with his equation *Philomythos-Philosophos*, how demonstrably true it is that philosophy develops itself out of mythology, we shall see with perfect clearness when we go back to the old Aryan Indians. The great vault of heaven, the sun in its daily course, the blush of the dawn, the moon, the stars, the winds, the clouds, the lightning, the bounteous rain falling upon earth, the flame that rises heavenward from the homely

hearth, all, in short, that the eye sees in its simplest lines, is the foundation,—the whole foundation—of the rich myths which we meet in the *Rig-Veda*. But these faithfully observed outer conditions of nature become thoughts and religion through the relation which they bear to man and which man bears to them. What the eyes perceive outwardly is conceived as a reflection of what is experienced within, and the inner experience seems in its turn to be a reflection of what takes place outwardly; and so eternally the pendulum swings to and fro. The unconsciously arrived at and utterly simple presumption is that the Cosmic and the Human are similar, that they reciprocally penetrate one another, that the macrocosmos might, without more ado, be indicated and understood by the microcosmos; “nothing is within, nothing is without; for what is within, that is without.” Nature is identical with man, man identical with nature. Any thought of a distinction does not yet exist. Such was the prayer which the old Aryan herdsman addressed to the gods of the dawn,—the knightly Ashwins, fore-runners of the Hellenic heavenly twins,—in the days when he dwelt in the highlands and possessed nothing resembling an abstract philosophy: not only did he pray for help against the dangers of the night, but also for knowledge, for wisdom; how would it be possible that the conqueror of the dangers of the night, the morning herald of the Sun, should not also be a conqueror of the night of ignorance, a giver of spiritual enlightenment. Not only does such a prayer say, “awaken the joy of courage in us,” a thing which the least imaginative of mankind might expect from the fresh breath of morning, but it says at the same time, “and bring us knowledge.”⁴ In the same way to the Sun-god Savitar is addressed the prayer, not only that he may bestow upon mankind the light which is the object of his desire, but also that he may “give furtherance to

thought."⁵ When the Sun rises I become wise : I have but to open my eyes and to perceive everything ; I find myself illuminated in surrounding nature, and nature illuminated in me. As the *Rig-Veda* says, " In the heart Varuna created Will, in Heaven the Sun." Of the same nature are both.

What is before us here is precisely the same as that which we to-day in our abstract and circumstantial train of thought call the " identity of thinking and being," that which once more came to high honour through Fichte, Schelling, and Hegel, but which also is the hidden foundation of Schopenhauer's doctrine, and amongst our contemporaries is not less conspicuous in such widely different intellects as Dühring and Wundt. What is with perfect simplicity set out by metaphysically gifted but primitive peoples,—seeing that the very thought of the possibility of a distinction between world and man, between that which is seen and that which is thought, does not occur and could not be understood,—is introduced afresh as doctrine by these philosophers. For instance, Giordano Bruno, who in this, as in most things, approaches nearly to Plotinus, teaches expressly that the ladder of the emotions of the mind (*affetti*) exactly corresponds to the ladder of nature, and so mirrors all the modes of Being (*mostra tutte le specie de lo ente*).⁶

It is essential to our work to-day that in this identification of that which is seen and that which is thought, and, if it be carried further, of Nature and Understanding, we should recognise the primeval Myth of all Myths : it is an identification which, from the earliest times of which we have any knowledge, has possessed a great significance for the philosophy of the Indo-European race. As a matter of fact, there is here a yawning gulf, and it is not only a cleft between world and man—considered as two separate entities—and between perception and thought—looked upon as two different

functions—but it is also reflected in Seeing and Thinking, and is the cause of our neither being able purely to perceive the world, nor purely to think, nor to look upon our own special self fully as subject or fully as object. That is the fundamental fact of our whole intellectual life, as it has been once for all established by Immanuel Kant. But man, when he was still completely unsophisticated, was not conscious of this fact, and connected the sides of the gulf by a bridge, which was no less obvious and iridescent than the rainbow upon which the German gods entered the Valhalla, but which was equally devoid of objective capability and carrying power. It is over this same bridge that mankind still wanders to and fro, though some engage as their guide the giant Schopenhauer, others the dwarf Büchner, while the greater number take any one of the numerous *Dii minores*. Looked at from a sufficient perspective distance, the difference between the unsophisticated creeds of an ancient Aryan contemplative herdsman, and the highly elaborated tenets of a Hegel, will resolve itself into a difference of degree; the critical solution is the only complete solution of the eternal riddle.

Since then this primeval myth was a fiction,—a violent assumption,—it was impossible to rest content with it. As in sleep dream begets dreams, so was it necessary that from the one myth others should be born, otherwise the bridge in mid-air would vanish, and the precipice would yawn at our feet. So, in the first place, we observe that the stem of the most primitive all-embracing myth forks into two main branches, just as inclination prefers to lay chief stress upon that which is thought, or upon that which is seen; speaking from the point of view of looking upon man as epitome and conception of the world, or, on the contrary, upon the world as the unfolding and visible representation of man. In the last case,—that is to say, where precedence had been given to the Seen

over the Thought, in course of time men reached an artificial philosophy, as happened in Greece, where the abstract thinkers everywhere held to that which is visible and capable of being represented, and always appeared in the character of creators or formers. Think of Democritus who invented the evidence of the atoms in the interests of an abstract cosmic mechanism, and Aristotle who brought the logical functions of our intellect into visible schemes. In the first case, that is to say, where men were inclined to lay stress upon thought alone, the result was that by degrees nature (apart from man) and the visible world, which had served as starting-point for the primeval myth, were lost to sight: their very existence was as far as possible denied, and every perceptible thing was more and more degraded in the thoughts of men, as in India when the Brahmans were at their zenith, where at last thought alone, pure and bare of all ideas, remained, the Ego in its highest potentiality, the all-embracing, unindividual Self (Paramâtman).⁷ Greeks and Indians have in all probability a common ancestry, and yet how different are the goals which they attain! You see how the direction of mythical thought and the direction of the development of culture go hand in hand.

But we must still linger for a moment over this first branching into two essentially different directions of the primeval myth of the identity of thinking and seeing; for we shall soon have to consider a variegated series of most highly complicated networks of thought, and these will only remain perceptible if we have from the beginning fixed our eyes clearly upon the mythical element. We are now acquainted with the great primitive myth, and we have just seen, how that same myth can give birth to two such different modes of contemplating the world, that nearly related peoples reach the opposite ends of the scale of thought. But it is easy for us to show the existence of these two chief branches in the souls of our

thinkers down to the present day, and so to learn to recognise the perceptibly mythical where we imagine abstraction to be at work in its utmost potentiality.

If I have up to the present spoken of man and world as in opposition to one another, I have done so because that is the conception with which we are chiefly concerned to-day. But these conceptions are too complicated and too abstract for unsophisticated nations; the first distinction, demonstrable even in the most primitive peoples,—a proved ethnological fact—is that which exists between those who are gifted with souls and those who are not so gifted. And since the idea of a soul is everywhere connected with that of breath, while breathing is the most important symptom of life, so the distinction between the man of soul and the man of no soul, is fused into that between a man who is alive and a man who is not alive. I, the man, the thinker, am gifted with soul and gifted with life; the stone that lies in my hand, the thing seen, the piece of nature, is evidently soulless and lifeless. But, upon more penetrating reflection, out of the primitive myth which makes the comparison of man and nature the foundation of all philosophy two opposite conclusions arise; for one school says, "I live and am gifted with soul, therefore everything lives and has a soul"; whereas the others have come to this conclusion: the world around me is a piece of mechanism, without life and without soul, therefore the Ego is the same. We will begin by making ourselves further acquainted with these two doctrines by examples; that will lead us to the workshop where the philosophies are hammered out.

The group of the older Hellenic thinkers, however much their opinions may differ, are usually included under the name of Hylozoists, men who considered that all matter, that is to say, the whole Cosmos, was gifted with life. The often quoted saying of Thales that everything is full of Gods,⁸ finds an exactly corresponding

formula some 2250 years later in Bruno when, in the *Spaccio*, he says: *la natura, come devi sapere, non é altro che Dio nelle cose*, "Nature, you must know, is nothing else than God in things." Bruno, the dreamer, the man whose glance is altogether directed inwards and who therefore fancies that he discovers an "inner" everywhere,—Bruno cannot imagine that even stones can be without senses and souls (*non est, crede, lapis sine animá et sine in suo genere sensu*, I², 158).⁹ And in the nineteenth century there lived an important, exact investigator of nature, Fechner, who pretended to have nothing to say to the phantasies of mythicism and mysticism, and who in spite of that looked upon the universe as a "Cosmorganism," and upon the constellations as half-way stations between their inhabitants and the "psycho-physical all-being" God.¹⁰ You can see how the myth, "I live, therefore everything lives," may lead to the most widely different thought, from the pure scholastic to the pure natural-scientific. Yet investigators and thinkers of equal importance created, and have created from the beginning of time, out of this same instinctive comparison of thought and seeing, a perception in contrast to it, that is to say, perception itself: nothing is alive,—nowhere in embodied nature are there any Gods. Such men direct their attention in the main to nature, and thence pay the more heed to the mechanism of occurrences; as a matter of consequence, in their view the part played by the soul shrinks away more and more. We need only think of the view held of nature by our exact science of to-day, and of the oscillations of the æther as they were treated of in the Leonardo lecture; that which is alive in light, that which in light is of direct significance for the human soul,—namely colour, entirely disappeared before our eyes; colour became in the end a superfluous, very inaccurate name for a number; then came the most advanced of the physicists and said, "we do not want

your whole visible Cosmos ; an empty space with energy is enough for us " (see p. 130 *seq.*). The man who was the absolute first to bring forward the idea of oscillations, Descartes, had the consistency to penetrate further inwards, and by the setting up of his famous theory of automata, to quash the idea of life not only in stones and constellations, but even of life in living beings. The body of animals, and *a fortiori* the form of plants, is, according to him, a machine: *Je ne reconnais aucune différence entre les machines que font les artisans et les divers corps que la nature seule compose* ; all motions can be explained *en même façon que le mouvement d'une montre est produit par la seule force de son ressort et la figure de ses roues* (*Les passions de l'âme*, XVI), and so Descartes reaches the firm conviction, that, with the single exception of mankind, all animals are automata, that is to say, unconscious, that they possess no in any way formed *anima* and no *sensus* ;—in short, that they have no life. But Descartes goes further, or at any rate he is inclined to go further. In his *Passions de l'âme*, he confines even the soul of man to the action of the Will, and to those sensations which find a response in the will, and not long before his death he confessed to a specially insistent correspondent that he only referred the whole understanding of the senses (*l'imaginer*) and sensation (*le sentir*) to the living soul, in so far as they were bound up with the body ; pure thought thus remains alone as something living, belonging to the soul,—a thought that neither imagines nor feels.¹¹ That is hardly more than an unthinkable phantom, a mere vindication of the soul. It would be difficult to explain what this man, who fought so hotly and unceasingly for pure perception, had in his mind here ; difficult to explain at any rate as what it was, namely the mere reversal of the unsophisticated mythological Hylozoism, unless India had once more furnished us with the full clue through the development of the same

idea pushed to its utmost possibilities,—Being insisted upon as opposed to Thought, Nature as opposed to Man. A thinker named Kapila, who lived some 2500 years before Descartes, and may have been almost a contemporary of Thales, taught as “a final, refined, infallible, absolute recognition” the sacramental words, I AM NOT. Not only is everything not full of Gods, not only are neither stones nor beasts alive,—no—man himself is not alive, even I, who am thus thinking, am not alive. “With these words, I AM NOT,” as an Indian commentator observes, “all that takes place inwardly, the distinctions of the organ of judgment, the delusions of the subjective organ, the consolidation of the inner sense, and the perceptions of the other senses, together with the outer functions of the body, are denied to the Ego.”¹³ But if both that which takes place within and that which takes place without are denied to life, then of all that is apparent only the original matter, the “root—primary-form,” as Kapila calls it, remains, and my own body, together with the thoughts of the brain, and the feelings of the nerve-system, is a mechanical Automaton. Kapila was a freer man than Descartes, he did not live under the tyranny of Christian compulsory beliefs, and so he could dare to follow mechanical thought to its furthest possibilities, and said to himself: even that which chiefly distinguishes man, the power of coming to logical conclusions, to form judgments, is still bound up with a material organ, and this organ, the brain, is “since it belongs to matter, non-intellectual, and therefore that which it establishes (i.e. the conclusions) becomes just as unintellectual as a pot and other objects.” Life becomes a mere hoax, since “the un-intellectual inner body is perceived as apparently intellectual, and in the same way the soul which has no share in activity is represented as active.”¹³ This soul that has no share in activity is the pure Self free from all dross,

from which all that is implied by *doing* is excluded ; it is "unconditioned and absolutely isolated, that is separated from matter," and as soon as the "delusion of subjectivity," as Kapila calls it, has lost itself, "it looks upon matter immovable and contented."¹⁴ That corresponds with tolerable accuracy to Descartes' idea of the *pure intellection* (II, 257) of the *moi* (literally the Self of the Indian), *qui est entièrement distinct du corps*,¹⁵ of a soul (Descartes prefers the word Intellect), which is something else than the phantasy of the Senses (*l'imagination purement corporelle*, XI, 266). It may be a matter of surprise to you to meet with the expression soul or intellect here. Do not be too hasty in your judgment. I reminded you just now of the empty space of our physicists : here you have the exact counterpart, the empty soul, the empty Ego. That idea of the empty space with nothing in it but motion is no mere joke, no extravagance of thrashers-out-of-thought gone mad, but on the contrary a theoretical acceptance to which prosaic, positive, antimystic investigators of nature are driven ; just as little is this empty soul of Kapila and Descartes a purposeless image of thought ; follow to the end one of those two paths which branch out from it, and it becomes far rather the inevitable, necessary result of that first unconscious act of power, of the contrast between man and nature, between thought and perception.¹⁶

These examples are enough to show you how deeply the simple primitive myth in all times, and even in the supposed newest results of human thought, reaches into the very inmost core of our philosophies. Whether the creation of form or the annihilation of form, whether the inclination to bestow a soul upon matter, or the inclination to materialise that which belongs to the soul be predominant ;—both tendencies may be referred to dreamy mythical presumptions, from which they of necessity proceed. But I think that we are now able to

observe in detail how far even series of thoughts, that are in appearance perfectly abstract, always go back to natural myths. We must in the first place take for our instruction a consistent concrete example, and it will be wise to confine ourselves to Greece, since Greek philosophy is universally known, and may be viewed in perspective from a sufficient distance: I must of course set to work with aphoristic brevity. But if once we obtain a clear idea of the development from Thales to Aristotle in main lines, we shall, I hope, be enabled to gain a complete perception of all those philosophies which are based upon myth, so that nothing will remain but the purely critical comprehension of the world-problem as opposed to every form of dogma,—that comprehension which Plato guessed at, and Kant developed in full perspicuity.

Thales, who looked upon the world as full of the deity, nevertheless did not make use of the Godhead like the Jews as a *Deus ex machinâ* for the creation of the world: the belief in Gods with whom he afterwards peopled nature was rather the creation of his own soul. But when once he began to look not into himself but into nature, he saw, like Homer, that everything must take place according to the immutable laws of mechanical necessity, and he held the opinion that the world must have developed itself out of some primitive element or primitive matter (*στοιχείον*), and that this primitive matter, the first cause of all visible things, was Water. Whence did he get this idea? Aristotle saw its origin in the primeval Hellenic myth of Oceanus and his consort Tethys, the first creators of all things, and now we are in a position to point still further back, namely to the myth of creation of the *Rig-Veda*, according to which the earth, with its life and love, was in the same way developed out of the dark flood of the waters. Something of the same sort, but expressed in somewhat different words, is the doctrine of modern natural science.

There is then no actual conscious difference between man, God, and the World ; the identity of that which is gifted with soul and that which is not so gifted, still seems a quite unsophisticated expression : everything possesses soul, everything is full of Gods, and at the same time everything is purely substantial and developed mechanically out of matter.

Inasmuch as it already contains rather more logic and rather less perception, Philosophy becomes much more complicated in the first Hellenic thinker who markedly turns away from Thales. In theory Heraclitus is just as monistic and just as hylozoistic as Thales, but if we follow up the course of his thought we see that he takes Man as his centre,—and distinguishes below him the World, above him the Divine. We may even say that Heraclitus is rather a thinker than an observer of nature, though that should not, as our manuals tell us, be considered as progress ; it is simply a question of personal disposition. Heraclitus exactly grasps at the primeval mythical idea of Breath, of the Breath of life, which is common to all Indo-Europeans, as the fundamental principle of the universal All. The Indian word *prāna* has exactly the same meaning as the Greek synonym of Heraclitus *πνεῦμα*, in the first place wind, air, then breath, and thence also life, and finally, looked upon as the invisible part of life, intellect or soul. Even the *hagion pneuma*, the Holy Ghost of Christian mythology, is the descendant in a straight line of the sacred Prāna of the Vedas. You see how these two, Thales and Heraclitus, stand opposite to one another in the plainest mythical simplicity. The one looks out upon nature, and says, “ there must be a fundamental element,—water ” ; the other looks inward into himself and says, “ here there must be a fundamental element, the breath of life.” That is much the same contrast as you saw before between Descartes and Bruno.

Now, however, we must go a step further, in the endeavour to investigate how Heraclitus out of this unity developed something double, that is to say, the world and that which is above the world.

The fundamental element, the breath of man, the invisible principle of life, condenses itself according to him downwards into a visible world,—upwards into the empyrean, purified into a conception of Divinity; for both purposes Heraclitus again clings to mythical ideas. Fire he praises as the material bearer of the breath of life, and so far the Creator of the perceptible All, since for him the primitive being is called *πνεῦμα καὶ πῦρ*, Breath and Fire. That too is a primeval Aryan myth, taken from a hundred observations of nature, followed by a comparison of thinking and action: Fire in heaven as daylight and warmth, Fire in lightning, Fire on the hearth, and as consumer of the sacrifice,—again the warmth of the body in life, in contradistinction to the cold of death; the glow of the flowing blood, and the warm bowels of the newly killed sacrificial victim,—is anything more wanted to prove that fire and life are one? Small wonder that the old Indian books expressly teach the equal significance of these two *pneuma kai pur*, "That fire which is this world, is also the Prâna, the breath of life."¹⁷

And now for the idea of Heraclitus as to the Godhead. It is wonderfully exquisite. Heraclitus is, as you have seen, fundamentally a monist: the meaning of his *pneuma kai pur* is this,—the essence of the invisible Ego (the breath of life) and the essence of the visible world (fire) is one and the same. This harmony between the invisible and the visible, between that which is thought and that which is perceived, is identical on one side with that which I feel as Destiny in the apparent accidents of my life, and on the other side with the inviolable divine necessity of that which has occurred, which I see in

nature: if I look out upon nature (fire), I call that universal harmony the order of the world (cosmos),—if I think upon it in my Ego (in the breath of life), then I call it Logos, the Word that is from the beginning.¹⁸ For the sentient philosopher these different names are Harmony, Fate, Necessity, Order of the World, Logos,—all nothing but different designations for the one Divine principle: but if a man takes his stand not upon the point of reflection, but of practical and political life, then he must honour this Divine principle under the idea of Zeus. That is why Heraclitus utters that deep simple, and for that reason only much-disputed, and in many ways misunderstood, saying, “The one, the only one that knows, may not, and yet may well be invoked under the name Zeus.”¹⁹

That is the way in which the best men of Greece thought about God some five hundred years before the birth of Christ; it was a lofty and beautiful perception, hovering in harmony between nature as seen by the eyes and the invisible Ego, and full of incitements to thought. But then came the great split. In Greece up to that time the Ego and the world had been held without any more ado to be identical: not in any way as if men had dogmatised over this identity, but it was looked upon as an open fact, and not a matter brought in question. It was possible to insist with Thales on the visible element of Nature, or with Heraclitus upon breathing thought; but that there was or might be a double possibility, that was a point upon which there was as yet no mistake. Then came reflection, and so it was that Nature and the Ego separated. The desperate attempts of the Eleatists, who shrank before no sophistry, to enforce the mathematical unity of all existence as dogma, are chiefly interesting to us as a symptom of the rupture which had taken place and could never again be satisfactorily adjusted. And just as the Ego and Nature had fallen asunder, so

too did now God and the World; consequently new conceptions had to be hammered out, new philosophies to be built up. But, in spite of all, visible nature never lost her dream-awakening power over our phantasy, and the fundamental myths held their own, as you will soon see, with slight and merely superficial changes. But from now on attention becomes necessary in order to disentangle the mythical element as such out of the fray.

As you doubtless know it was Anaxagoras who, with his idea of *νοῦς*, founded a new conception of the Divinity. *Nous* is generally translated, though in admittedly unsatisfactory fashion, by "thinking essence," or more shortly by "reason." If I understand the explanations of the professed savants it corresponds more to the Latin *mens*, the English *mind*, translated by the French as *intelligence*. Really the exact translation is a matter of small importance: what you have to understand is this, that the *nous* signifies the exaltation of the Ego to the prejudice of Nature, and that means the exaltation of logical reflection at the expense of Seeing and Observation. Just as logic orders the thoughts of men, so Reason orders the world; "in the beginning everything was confusion (*μύγμα*), then came *Nous* and created the order of the world." You perceive that the primitive myth of chaos to a certain degree furnishes the foundation for this new belief of reason, but now rationalism assumes the autocracy, and it is not the forces of nature, but the powers of reason outside of nature, that bring the world into existence. That is why Anaxagoras is justified in calling his *Nous* *ἀυτοκρατής*—an autocrat. It is really remarkable to see to what a distance this new God is at once removed. Thales had seen Gods everywhere, Heraclitus had felt the presence of the divinity at every step; but now the Godhead, always invisible, fades away to the extreme boundary of the universe; it is only the

“ordering power,” the first “originator of movement,” hardly more than a mere thought; and indeed not a mystic thought symbolising nature like Vâc-Logos, but an abstractly concrete thought: itself as yet only immaterial unformed thought, not a form evident to the senses, but so far as the world is concerned a simply mechanical, not subjective, necessity.

You will see directly what I mean.

You remember that Descartes and Kapila by distinguishing the soul entirely from matter had, so to speak, arrived at a purer, completely mechanical nature. The same thing occurs here. Anaxagoras, by creating a God above and outside the world, strips nature of its divinity, and considers it as more purely mechanical than his predecessors did: that is the salient point. For Anaxagoras himself the invention of *Nous* had not much more significance than the *cogito, ergo sum* had for Descartes. But our professional philosophers to whom everything abstract seems to be something specially exalted have manufactured an Anaxagoras, to whom the true one bears but slight relation: they sing praises like the priests of the temple in honour of the discoverer of “a higher purely spiritual conception of God,” and do not see that Anaxagoras simply had in view a rational natural science, and only makes use of the God of his thoughts, in order to be quit of the Gods of direct perception. For his eye is fixed upon the World, not upon God; his mode of thought is entirely mechanical. He himself confesses simply that he only appeals to his God, when he is at a loss to know how to get on without him. In so far as he cannot imagine the rise of an orderly system without a Reason to create the order, he needs his God in the abstract: but he wastes no time over this rationalistic reflection, but hurries away to the visible world in which he now needs his God in the concrete, because he does not know how without him he can explain the cause and

maintenance of the first all-comprehensive rotary movement : in no other way does he make any use of his God—*Nous*.

Here then there exists a very important departure from the completely unsophisticated identification of Thinking and Seeing. But how closely, in spite of that, Thought and Seeing here hang together, has been shown by Wilhelm Dilthey in his *Einleitung in die Geisteswissenschaften*. Anaxagoras, like Thales before him, was a passionate watcher of the stars. When he was asked why man should prefer Being to Not-being he answered : on account of the starry heaven. But with him it was no mere question of sentimentality. It was rather that he possessed far more correct views of the cosmic relations than Aristotle. For example, he knew that the moon is great, and believed it to be inhabited : he knew that its light is light reflected from the sun, and he knew that the sun is more remote from the earth and greater than the moon. But above all there were two facts in the starry heaven which captivated his reflection : he saw, as his seafaring fellow-countrymen had done from immemorable times, the fixed star at the north pole of the firmament, and he then observed that the stars in its immediate neighbourhood revolved round it in very small circles, while the further stars moved in ever larger circles, and so he came to the idea that the whole heavenly globe moved round one axis. That was already an observation of fundamental importance. But besides this Anaxagoras possessed a sound physical instinct, such as perception alone can give, but thought never can. Gravitation was known to him, and inasmuch as he held the sun, the moon, the stars, not as Aristotle did later, as fixed to concentric spheres, but as independent bodies moving in space, he came to the conclusion that they must necessarily fall upon the Earth, unless the same centrifugal force which once drove the primeval elements asunder, swung them

continually in a circle, " as we swing a stone in a sling." You see what a mass of truly scientific mechanical perception of Nature is at work here. Listen again. Dilthey informs us that " the northern final point (of the axis of the heavens) is the cosmic point, from which out of the *nous* of Anaxagoras, the circular motion in matter started, and from which it still at the present time works. The *nous* began on a small scale ; the point where that took place was the pole ; from that point the circling became wider and wider, and will continue so widening, and it was thence that at the same time with the revolutions the division of the atoms took place." When we think of the state of knowledge of that time, we may well rank this idea as a scientific contribution to thought in a parallel line with the so-called Kant-Laplace hypothesis : the fundamental observations are few in number and not quite correct, but the prophetic conception of the state of facts is striking. For our theme to-day the one point of interest lies in the fact that the God of Anaxagoras and the unity of that God is not a metaphysical deduction, as is the case with Bruno and all monists, but that this contemplator of the world comes to his conclusion inductively out of the necessity for a First Being who should set the cosmic machine in motion, and out of the observation of the one and only axis of the starry heaven.

You see that the great cleft of which I spoke a while ago was as yet relatively not very deep. This divine reason,—of which the ordering activity consists only in the maintenance of a common centrifugal motion, while all else occurs automatically,—is hardly more than a hypostatized fundamental force of nature. And yet the step which had here been taken, was one of great importance. The divine had been isolated from the world, and had been contrasted with it as an intellect without body in contradistinction to bodies without intellect ; and that

introduced firstly the method of Analysis, that is to say, of dissection, and secondly paved the way for considering the human intellect as related to the *Nous*, so that a loftier wisdom might be created directly out of it than out of the faithful contemplation of nature. Analysis at once does away with myth ; for the latter is essentially combination, whereas the former is separation. The rationalistic importance assigned to logic, as if it were the fundamental law of nature, equally abolishes the myth, and replaces it by syllogisms. But inasmuch as without the myth to serve as bridge, without the assistance of some dream-form no unity and therefore no philosophy can be arrived at, the consequence was not that myths really disappeared, but that they were from that time forward introduced more clandestinely and violently. The old Indians, for instance, had expressly declared that their accounts of the creation were only to be taken figuratively,—only as an attempt to represent symbolically that which is unknowable ;²⁰ these people then upon whom we think ourselves able to look down, knew precisely that their myths were myths, they did not demand for them that stupid belief which is required of us in religion and science. In the same way we find the Hellenic myths flowing steadily until the great break comes : from that time forth reason is dominant, believes itself to be of divine origin, sees nature at its feet, and deludes itself into the belief that it knows : that is why its assertions are dogma, and faith is demanded for its dreams. With the help of Socrates and Aristotle this connection of events will be made clear to us, and we shall see how in this way men became in a higher degree the slaves of their mythical ideas than their ancestors had been. What we call " Progress," a word with which childish unreflecting minds intoxicate themselves, is always dearly paid for.

In the *Phædo* there is a passage towards the end (96, seq.)

which gives me the impression of a really historical report of remarks which probably often fell from Socrates; immediately upon that Plato steps in again with his doctrine of ideas; but what Socrates objects to in the doctrine of Anaxagoras proceeds from Socrates himself. The latter tells us how in his youth he studied natural history zealously; but that his hope thereby "to discover the causes of things," and to learn "whether animals arose out of putrescence," how their growth took place, and so forth, was disappointed; that he discovered that he himself "had no aptitude for such investigations"; but that afterwards he comforted himself by the discovery that "the real essence of things lay in our human thoughts about them," and that men should guard themselves "against injuring their eyes" by the contemplation of things themselves!²¹ And so he laid hold upon the writings of Anaxagoras, because he had been informed that this philosopher had represented reason as the ordering law of all things, and this led him to hope, that in Anaxagoras he would find the solution of all the questions of nature. For if, for example, a man should wish to know whether the earth is round or flat, it "would not become him" to establish this by investigation of the facts, but he need only ask himself,—which is the more reasonable? which is the more advantageous for mankind? This must of necessity be right, because it was reason (the *Nous*) that organised the world. In the same way the question as to whether the earth is stationary in the middle of the universe, or whether, as the Pythagoreans had already long taught, it moved in space round a centre, could only be answered by the weighing in reason of the pros and cons of the advantage to be gained. "Is it better that the earth should stand in the middle?" That, according to Socrates, is the question to be asked. "If Anaxagoras made this clear to me I made up my mind never again to listen to any other manner of proof."

Socrates soon came to grievous disappointment. For Anaxagoras looked upon the *nous* (as against nature) as a mere first cause of motion: beyond that he was dominated by purely scientifically conceived physical laws. "And so I fell right down from my wonderful hopes," Socrates complains, "when I saw that the man with his Reason establishes nothing, but brings forward all sorts of stories about air, and æther, and water, and similar wonderful things." That is the historical turning-point. Thus it was that mankind turned their backs upon nature, until in the thirteenth century the Teutonic renaissance burst into life. Socrates might well have deserved to be raised to the dignity of a Father of the Church. It is true that with the Epicurean Lucretius a reaction took place, which at least taught the love of nature, and the neo-Platonist monists worshipped it as the living Godhead; but no one took the pains to consult nature, to observe it, to copy it in thought with love and obedience, and in that way to wrest its secrets from it.

Then there appeared the man for whom Socrates had longed but had not found, the man who "made reason the beginning of all things," and who to every question gave the apodictic answer, "as it had to be," without first attempting to see what it was in reality. Aristotle demonstrated that the earth must be a sphere, not in any way because he attached any special value to the observations which were already to the fore in his time about the height of the sun in different latitudes, but because it was the most perfect of all forms and therefore the undoubted property of the earth, to which he added the further precious reason, that the spherical form is peculiar to those bodies in which all movement is absolutely wanting. As forcibly he demonstrated that the earth was stationary and in the middle of the universe, and that there neither was nor could be any second constellation, but only luminary bodies attached to hollow spheres

which circled round the earth, and so forth. But you must know that a hundred years before Aristotle, Philolaus had taught that the earth turned upon its axis, and that it circled round some unknown centre, and that the better informed of Aristotle's contemporaries knew that this centre was the Sun, even though the mathematical proof of the heliocentric system was not given till some seventy years after his death by Aristarchus of Samos;²² it is not until you reflect upon this that you will realise what a fateful influence was exercised upon the culture of Europe by that supremacy of thought over seeing which was heralded by Anaxagoras, promoted by Socrates, and brought to perfection by Aristotle. From that time forth empirical proofs were of no account,—absolutely none; what Socrates had preached—never again to listen to any other mode of proof than that which was logically rational, had become an iron law for the cultured world; *ratio locuta est*, reason has spoken; the age of the tyranny of intellect had begun,—the domination of blind, sightless reason. What had taken place in the idea of the Cosmos, naturally happened also in the idea of the Divinity: it was fixed dogmatically: as Cicero in his historical retrospect of philosophy says: *mentem volebant rerum esse judicem, solam censebant idoneam cui crederetur*; "they asserted that mind should be the judge of all things, that mind alone was worthy of credence."²³ The *nous* of Anaxagoras was now on a more exalted throne, and other authorities were regarded as its delegates. In every single particular, Aristotle defined to a hair's-breadth, what, and how, and where, and why the intellect existed: and so the *nous*, after it had assimilated itself to the Jewish Jehovah, became God to the European world,—laying down the law for all Christian theology down to the present time. Kant dethroned the *Nous-Jehovah* for ever, a fact which the world does not yet realise, but will learn by degrees.

What must specially interest us in the connection of these achievements is the circumstance that although Aristotle, in the consideration of God and the world, went to work in so abstract and rationalistic a fashion, he too drew upon the collected material of perception and upon a purely mythical comparison between thinking and seeing, for his fundamental ideas and for everything that possesses power of formation and living energy in his conceptions. That his *nous* is rooted in the *nous* of Anaxagoras he himself confesses, and that may be taken as an indirect connection with nature. Even Aristotle looks upon God as before all the "unmoved first cause of motion"; he considers God as first and foremost the cause of the revolutions of the heaven of the fixed stars. But Aristotle as a keener analyst perceives something of which Anaxagoras, the more physical observer, had not thought; that is to say, that it is difficult to bring this extramundane bodiless intellect into union with the world of matter; certain intermediate steps are here necessary to bring into inner harmony the first and outermost motion. Thus Aristotle looks out upon the heavens, or rather he looks into the books of the astronomers, and sees that there is no unity in the movement of the constellations: between the fixed stars, the sun, the moon, and the planets move with all manner of shiftings forwards and backwards, standing still and so forth. Beside the comprehensive movement of the heaven of fixed stars, which alone Anaxagoras had taken in view, there are also other eternal motions which equally can only be ascribed to immovable intellects, even though they should be bred of the highest *Nous*; obviously there must be as many of these intellects as there are different visible motions in the heavens, and these reach one another reciprocally from the highest and outermost to the lowest and innermost. But Aristotle allows the method of reason, with its inclination to structures in

harmony, to go still further. The world must be built up of just so many substances, no more and no less, as there are motions and intellectual causes of motion ; and we must be able to distinguish just as many aims as active in nature.²⁴ You see what an endlessly artistic, and, at the same time, artificial, structure is set up here under the mask of reason. The next matter was to decide how many of these motions, intellects, substances, and aims are there ? The answer to this question turned out to be more complicated than you might at first suspect. You might say to yourself, the Greeks recognised five planets, the sun and the moon, so we shall probably be right if we reckon upon seven motions, intellects, substances, and aims, adding to these the heaven of fixed stars as an eighth sphere. You would be far out. Sophistry is intolerant of simple solutions. The truthful perception of Anaxagoras and many of his contemporaries that every single fixed constellation is floating in space had been rejected at the outset by Aristotle as contrary to reason. There can only be one earth, and that must rest immovable in the centre of the All ; that is dogma, for that is demanded by reason, But out of this postulate of reason the necessity arose once more to bring to the front the old fable of Anaximander of the heavenly spheres and the luminary bodies attached to them. But since the wandering stars, sun, moon, and planets apparently carry out extraordinarily complicated motions between the fixed stars, and it was nevertheless a dogma that all the motions in heaven complete themselves in perfect circles,²⁵ you will understand that in order to explain the phenomena in this way, it was necessary to accept the idea of spheres rather than of stars. In order to explain the motions of each separate wandering star between the fixed stars, it became necessary to accept the idea of several spheres, contained within one another, set in motion in various directions. So the question was not,—

how many different wandering stars do we see in motion ? but,—how many invisible spheres must we assume, in order to explain the motions which we observe in the visible fixed stars ? It was necessary to assume at least four spheres for the relatively simple motions of the sun between the fixed stars, and correspondingly more for the other wandering stars, and so without reckoning the outermost all-embracing sphere of fixed stars, three-and-thirty spheres came to be assumed, “ within which the stars really move.” Yet even that was not sufficient mathematically to explain the movements of the planets according to the dogmatically immutable presumptions. Two-and-twenty auxiliary spheres had to be assumed in addition, in order, as Aristotle puts it, “ to pack up the other spheres.”²⁶ Think of the *Plateforme roulante* of the century exhibition at Paris, set up in a complete circle, and upon this regularly and symmetrically rotating platforms, a number of incandescent lamps securely nailed to it,—that would be a representation of the heaven of fixed stars. Now imagine to yourselves seven wheels of different sizes, running round at different speeds upon this disc ; to every wheel a second wheel is attached in some special eccentric corner with a direction and speed of its own ; on this wheel is placed another, and so on, and it is not until the last is reached that the illuminating body, alone visible to you out of this whole mechanism of wheels, comes into play : but you stand in the middle and watch the movements of the many luminous bodies circling round you with unalterable regularity, and of the seven other lights which move irregularly : in this way you will have an approximate idea of the spheres as Aristotle conceived them, with the exception that he was dealing with hollow balls, not as in this simile simple discs. Aristotle imagines to himself 55 of these balls partly boxed in one another, partly fixed to one another, and with different movements, and to

these he adds one outermost 56th ball. From this strictly logical deduction he concludes that there are just as many "intellectual powers" at work, that is to say, 56, creating motion,—an equal number of "substances" building up the world,—an equal number of "aims" whose decision settles all that happens.

You will have remarked that even in this rationalistic cobweb of the brain which to-day seems to us so mad, the observation of Nature is nevertheless also co-operating and informing, and we evermore find Thinking and Seeing placed in direct relation to one another, in accordance with precisely the same presumption of identity between the two which we observed in the Indo-Aryan herdsmen. If the latter hungered after wisdom, they turned to the Sun: if Aristotle wishes to search out the numbers of the active "aims," he consults the stars. And it is precisely through Aristotle that one of the most primeval ideas of all Indo-European mythology, prettily tricked out with scientific frippery, once more comes to great honour:—Varuna, in Greek *ὄυρανός*, that is to say, the "all-embracing," the true God of heaven, in whom as the *Rig-Veda* expresses it, "the heavens are locked," literally as in Aristotle all the spheres are internally imprisoned in the outermost sphere of heaven. Not God alone is unconsciously borrowed from the myth, but also Substance, Matter, the idea which is set up in opposition to God. The Nous-God, the only completely purely intellectual Being, rests outside of the world, beyond the heaven of fixed stars. The primeval substance on the contrary (*ὅλη πρώτη*), that is the completely un-intellectual matter, has its lair in the inmost depths of the world. So now the two extreme points, God and the World, stand contrasted in full logical clearness; between them are the 56 intermediary stages, the outer ones by increasing ratios more intellectual and less material, the inner ones by increasing ratios more material and less

intellectual. The *Nous-God*, the pure intellect, is without matter and immovable; its being is only a thought, and it thinks no thought, for that would be transient, but "its thought is a thought of thought"; but the *πρώτη ὕλη* is so entirely matter that it neither has nor produces forms—for these would at once be thoughts—but only contains the inexhaustible power (*δύναμις*) of formation; just as thought could not think thoughts but only the process of thinking, so this material cannot be things, but only that which is no thing: in imitation of the Aristotelian language we might say of the primeval substance: its being is a being of being. It is impossible to push utter senseless scholastic abstraction further. But just as that God, looked at more closely, appeared as the old Varuna of the myth common to Aryans, and even now current with children as the Heavenly Father, so we may easily carry back the *πρώτη ὕλη* of Aristotle to the mythological ideas out of which this so-called purely logical comprehension arose. Among the Aryan Indians this primeval substance was called *asad*; they define it as the "non-being being," and with those three words you have exactly the idea upon which Aristotle wastes pages and pages of senseless dialectics. Under the guidance of this *asad* you reach the familiar primeval idea of chaos as a world not yet ordered by thought, or to speak more correctly, not yet disentangled inside any thought. Uranos and chaos are thus the perceptions out of which these apparently pure abstractions draw that modicum of the sap of life without which even shadows cannot enter upon existence.²⁷ As forms of conception, however, *Nous* and *prote hyle* (or God and World) are no more than the attempt to distinguish between Thinking and Seeing, in other words the dissection of the primeval myth of all myths into its component parts. But as we saw in the former lecture and shall soon explain again from another standpoint, something impossible is here

demanded of human nature ; and so the paradoxical result arises that the pure object of thought (God) no longer gives us the smallest point for thought to lay hold of, and can only be perceived in the visible rotary movement of the starry heaven, whereas the object of sight (the primeval substance) becomes imperceptible to the eye, and only has a sort of imaginary existence as a conception devoid of idea.

With this we may claim to have left behind us the second stage of the road along which this excursus leads us. First, in Bruno and Fechner on the one side, in Descartes and Kapila on the other, we have seen how the dream-born identification of thinking and seeing can lead us either to endow all nature,—every constellation and every stone—with life and with soul, or else to look upon even living beings as mechanical automata, and indeed to say of our own Ego, I am not. We have now studied one of the possible developments of the primeval myth in a series of consecutive thinkers, and we have seen how in Greece in the course of some 250 years the distinction between Thinking and Seeing, the two roots of our human Being and so also of our Senses, was continually being more and more clearly felt, and more keenly worked out, until at last here also a perfect Paradox was brought into being, and the pure object of thought (God) could only be seen,—the pure object of sight (the substance of the World) could only be thought. As I have already pointed out, it is the dream-nature of our senses, as opposed to true critical reflection, which is ultimately responsible for contradictory results of that sort ; we may admire and sing the praises of the bridge of the rainbow, but we can hardly hope that it will carry us over the yawning abyss. I think you will admit at once that the *nous* and the *prote hyle* of Aristotle are just as much dream-pictures as the Gods wandering upon earth, the world-creating primeval

water of Thales, or the *Pneuma-Logos* and the fire of Heraclitus.

Now I shall call upon you to face a third and more comprehensive consideration. I think that I shall be able to convince you that the fixed inter-relation between Seeing and Thinking,—the manner and way in which that original comparison takes place in every brain, or to retain our metaphor, the way in which the mythical rainbow bridge forms itself and of necessity must form itself in every one of us according to the capabilities of his brain,—is the determining power which influences the manner of thought in every individual. The possible forms of philosophy are all as it were ready to our hand, that is to say, prefigured: they are given by the nature of the human intellect; whoever analyses to its foundations that which is personal, will reach that which is beyond personality. And just as in biological sciences the recognition of the species helps the study of the individual, so will the recognition of the generally possible "species of philosophies," in opposition to eternal history with its eternally crooked judgments, be of great service in the accurate investigation of the individual.

You must in no wise believe that what you have seen in Hellas, the issue out of the concrete into the abstract, and of simple monism into maturely considered dualism, is a necessary development. Such conceptions with which we have been tarred and feathered since Hegel's time, and under the influence of the prevailing Darwinism, hinder all true comprehension. We pronounce the magic word "development," driving the phenomenon into boundless distance, and when we have lost sight of it, we believe that we have "explained" it. What "develops itself" is always the subsidiary, whereas what we want to arrive at is the essence of the thing itself. The progress of the so-called "development" may quite well be exactly the contrary in the gradual reversal of the philosophy of a

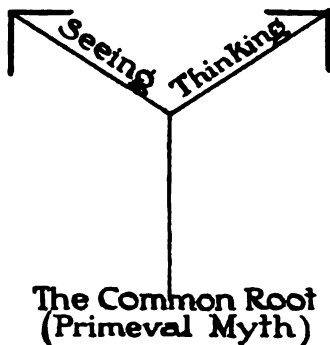
people. Amongst us moderns we can see both at once : a progress towards more and more abstraction (Hegel and the new school), a progress towards the more and more concrete (Descartes and the investigations of Nature) ; in Greece also Democritus laid the foundation of scientific empirical materialism at the very time when Socrates was paving the way for the autocracy of logic: There can never be any true understanding of phenomena when that which is mutable in them is taken as the foundation instead of that which is stable and eternal. That is why, fortified by the historical example of Greek mental achievements, we must now go further, analyse more exactly, and endeavour to reach the eternal super-personal foundation out of which, as the necessarily constant ground of all human Thinking and Seeing, the differently natured, and yet again imperishable, philosophies, so peculiarly inter-chained the one with the other, proceed. Everywhere in nature, if we are unprejudiced and yet keenly observant, we can discover great simple relations : the same holds good with our brains ; once these relations are clearly recognised and distinctly formulated, then we can the better penetrate the numberless eternally new phenomena of the Personal.

With this view I will now propose to you a Scheme—a Scheme of the possible ways of Seeing and Thinking, and of their possible combinations ; you will see how exactly our different philosophical systems are conditioned by these inborn aptitudes, and therefore by what we have hitherto for brevity's sake called the Manner of Seeing.

My previous lectures have shown you what I think about Schemes. A Scheme must be schematic, it must never shift its ground into the place of living insight, of which it must only be the handmaid. You already possess a certain store of living insight, and the rest will

follow by degrees, until the skeleton of the scheme is clothed with flesh and blood as in the case of Descartes.

I offer you a twofold dichogamy, a double branching. The primeval simple myth of the complete identity of Thinking and Seeing forks in the first place into two chief branches, according as the balance leans towards Thinking or Seeing ; that we have already fully explained by many examples : then the Thinking and Seeing themselves fork each into two branches, as will immediately be more nearly set out as soon as we have sufficiently made the first great division intelligible :



Analysis then, in the first place, gives us the distinction between men who are mainly Seers and those who are mainly Thinkers. For simplicity's sake I put it in this way ; the contrast may be looked upon more narrowly or more broadly without being done away with, so that it comprises domains not necessarily differing in size, but different in general. That, however, need not trouble us here ; each of the different possible contrasts is an exact symbol of the other ; the contrast is clear and sharp ; it is that between understanding and the power of the senses (see the previous lecture), between

reason and empiricism, between the invisible Ego and the visible world, between ratiocination and observation, between the abstract and the concrete; Thinking and Seeing comprise all these contrasts. I do not think that you will ever fall into doubt, or at any rate that you will ever remain in doubt, as to which of these two classes any pre-eminent intellect belongs to. You have seen how instructive was the contrast between the Seer Anaxagoras and the thinker Socrates: just in the same way Democritus and Aristotle, Descartes and Duns Scotus stand opposite to one another. Among the Indians, even among those who appear as atomists, Thinking is with all of them the preponderant branch, whereas with a Goethe, Seeing, in quite as extraordinary a degree, gives the casting vote. In this relation Goethe stands upon the same footing as the old Hellenic hylozoists,—on the footing to which alone Kant allows any value in the investigation of nature; while, on the contrary, Bruno far outdoes even Aristotle in giving the preference to thinking, and so must be reckoned with the Indians, and Plotinus and Hegel among the one-sided Thinkers. Those pre-eminent intellects then with whom Thinking is markedly preponderant, deserve in a closer sense the title of Philosopher, and also enjoy the outspoken preference of our schoolmen, whereas those in whom Seeing is predominant are often not looked upon as philosophers, though they are certainly what the Germans call *Weltanschauer*, "observers of the world," and not seldom in a more prominent degree than the others.

Here I must put in a caution against misunderstandings. The distinction between Thinkers and Seers, however real it may be, only points to a greater or lesser, or to put it better, a preponderant direction of the mind. Just in the same way as understanding and the senses grow together so inseparably that neither can exist without the other (see p. 276), so all Thinking is rooted in Seeing

—(as you perceived just now in the most abstract thoughts)—and no Seeing can exist without being bound up with Thinking. A man may be as specific a Thinker as he pleases, or as a Seer of the world busy himself ever so passionately with all possible pure Seeing, still that Thinker must at every step See something, and the Seer can never succeed in purifying what he sees from the element of Thought, otherwise the one would have mere empty thoughts, and the other would have blind perceptions (p. 226). Even the author of the *Brihadâranyaka Upanishad* can only speak in diagrams, and Goethe is compelled to repeat his perception of primeval forms as thought. In every personality then we have the two, a Thinking and a Seeing, and as we are only taking into consideration the master-intellecets, we may expect to find both supremely developed; our distinction only should serve to express the predominance of the one element over the other. This predominance, however, is a fundamental fact, perhaps the weightiest of all in gauging the intellectual personality.

Still, in spite of all that, the knowledge of this fact alone does not lead us to the more exact appreciation of the single individuality, since the mental horizon defined by the preponderance of Seeing or Thinking is very wide, and embraces very variously constituted intelligences. Thus, for example, Aristotle and the Indians come together as specific Thinkers, and are yet fundamentally different; while, on the other side, the extreme Thinker Bruno, and the Seer Democritus, the master of Form, are in harmony in certain important doctrines. We must therefore carry our analysis further, by which means we shall discover not only that each one of the main branches, Thinking and Seeing, is again split in two, but also that the special form of intellect is quite remarkably determined by the relations between Thinking and Seeing. It is just in the specific Thinker that it is

important to know how his Seeing is constituted, and in the specific Seer in what lines his Thinking runs. With the help of our simple scheme you will soon gain a clear insight into these relations.

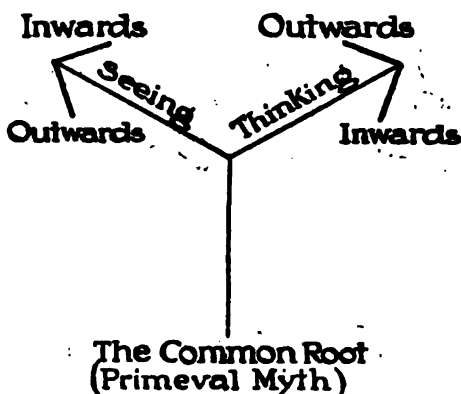
As the result of a very simple observation we find, as I have said, a new forking of each of our two main branches, Thinking and Seeing, into two side branches. If I might express myself figuratively I should say that Thinking may be directed inwards or outwards; Seeing can in the same way be adjusted in one or other of these two directions, inwards or outwards. Thinking can look towards itself and, turning its back on nature, see only the Ego, or—since *seeing* is in this case impossible,—ponder upon it; or else Thinking can be turned upon perception and, in spite of all abstraction, raise itself aloft in Nature. In the Indian doctrine of the Vedânta, in which at last everything—even Brahman—the all-embracing Divine—resolves itself into the Ego (*Atman*), the first of these, Thinking directed inwards, is characteristic; while Aristotle, who formed his conceptions of substance on exact observations of the movements of the stars, affords us a pre-eminent example of the second case, Thinking directed outwards. In Seeing the same distinction takes place, and that in a most striking way. For example, the Seeing of Democritus is entirely directed inwards, that means towards Thinking: it is true that this sage is a characteristic Seer, who takes nature, not thought, as his starting-point, indeed he violates Thinking where it is necessary: in spite of that, his atoms, his empty space, his mechanical explanation of the soul, are all "perceptions of thought"; that is what constitutes their value, and at the same time their worthlessness; that is why they are so practical for methodological appreciation, and so inadmissible as soon as we grasp them with pure perception. Descartes' eye, on the contrary, looks in the other direction, outwards and away

from Thinking. It is very easy to laugh over Descartes' crotchets, his Vortices, and so forth, to reproach him with inadequate thought and the violence of his combinations in his symbolical diagrams; he was a man who needs must see everything in actual fact; he knew no rest till he had taken in a combined Whole with his eyes; it was impossible for him to think unless he saw.

We can therefore distinguish a method of Thinking inwards and a method of Thinking outwards; a method of Seeing inwards and a method of Seeing outwards.

With a view to the practical proof of this distinction, I will at once call your attention to the fact that the distinctive intellectual attitudes, where they appear with any measure of consistency, must lead to fixed philosophical methods—they must do so, there is no way out of it,—and these philosophical opinions can in turn in doubtful cases render us good service for the detection of the inner tendency of a particular thinker, and give us the possibility of an unerring diagnosis. Thinking which is directed inwards will always lead to a more or less clearly formulated monism: the Ego, though perhaps not a uniformity (which is contested by certain psychologists), is nevertheless an organic unity, indeed the only one which we know by experience; the man whose Thinking is directed upon the Ego may not always reach the *Atman*, but he will always reach some variety of the Alone: the thinking which is directed outwards is in the same way of necessity pluralistic, inasmuch as nature is manifold. You need only think of the fifty-six substances of Aristotle; every man who thinks inwards, a Çankara, a Parmenides, a Plotinus, a Bruno, a Hegel, looks upon an idea of that sort, with the whole argument that leads to it, as an abomination: if such a thinker needs numbers, he brings them forward in a Pythagorean manner as magic-working symbols for thoughts which

impose laws upon nature, but accept none from her. Of **Seeing** we may say, that **Seeing** which is directed inwards, that is towards thinking, leads with precisely the same necessity to Atomism, and that **Seeing** which is directed outwards, or away from thinking, leads to the idea of an **Organism**, that is to say, of a universe complete without a lacuna, not falling into separate parts. It is true that **Nature**, as I have already remarked, shows a manifold character, and yet at the same time a flawless unity: the



idea of the atoms does away with both. The calculating man, a Newton, and the Greek who cannot cease reasoning (a Democritus), will always reassert the theory of atoms and empty space; in that way he learns and teaches mastery over nature; but the man with eyes fixed open upon living nature, the man who in the process of perception resolutely, and with distrust, turns his back upon **Thinking** (a Descartes, a Goethe), will never be reconciled to "forces working at a distance," and "the breaking up into atoms"; he must have a Whole, of which the manifold character is not a mechanical but an organic unity.

Let me impress this upon you by a tabular statement :

Thinking	{	Inwards —Monism (Domination of the soul)
		Outwards—Pluralism (Dualism of body and soul)
Seeing	{	Inwards —Atomism (Mechanism)
		Outwards—Organicism (Dynamism)**

and with this I add for the further explanation of our table, that monism always leads, sooner or later, to the acceptance of the domination of the soul in nature, whereas pluralism achieves its first and most important separation in the severance of body and soul ; that the idea of Atoms of necessity involves the purely mechanical significance of phenomena—(that is to say, by pressure and impact),—whereas the organistic view leads you to that significance which Kant called the “dynamic,” and which ultimately allows all that happens to be conditioned through the figure, that is form, comprehensively imagined, and therefore through the shape of the universe as a whole.** Looked at from the point of view of Seeing, it is just the Ego (upon which Thinking inwards is directed), which represents that which is entirely without form, whereas nature represents unconditional form: hence atomism, which arises out of Seeing inwards, disintegrates all form, whereas Organism (born of seeing outwards) proceeds from the fact of form.

In order that you may at once picture to yourselves something intelligible in this last distinction which may perhaps offer some difficulties to those who have had no training in natural science, I will refer you to the following example, which, complicated as it is, you may yet be able to grasp, and which is at any rate stimulating : Darwin,

the Democritus of organic science, a man whose Seeing, like Newton's, is always directed inwards, and therefore has no pure view of Nature, while at the same time he utilises her practically and logically,—Darwin is an atomist in the domain of Organism. In his view every being, every individual, stands as it were alone. All organisms vary into infinity in all directions, and it is only the accident of surroundings, which contain all manner of hindrances and stimulants, which causes a temporary misleading permanency of forms. For instance, if our butterflies have a very long proboscis, that arises out of the fact that those with a shorter proboscis can draw no honey from those flowers with high funnel-shaped blossoms (*Lilium*, *Paradisica*, *Crocus*, *Dianthus*) which they delight in visiting, and must consequently die or else, adapting themselves to other flowers, develop themselves into another species. In that way Darwin attributes to the flower the evolution of the long proboscis. And his pupil, Hermann Müller, says the same in another form, when he writes in his treatise on Alpine plants (*Alpenblumen*, 1881, p. 509): "The butterflies have the advantage of having been able with their long, thin proboscis to raise a breed of plants." It little matters whether the butterfly breeds the flower, or the flower the butterfly, if you only learn to see how in this conception atomistically every single living individual stands in relation to every other.³⁰ That is why Darwin constantly uses the expression "a species is being manufactured,"³¹ and gives it as his opinion that it is unlikely that such a manufacture, or any one of its parts, should suddenly have come into perfect existence.³² On the other hand, an organic conception of the forms of life must represent form as its primary condition. It would look upon perfection and imperfection as a human fiction; it would never admit that nature could by practice produce to-morrow what it is incapable of producing to-day;

rather should the whole life upon earth be regarded as an organised Whole, in which every part stands in relation to every other part, and in which neither the flower breeds the butterfly, nor the butterfly the flower, but both arise at one and the same time out of the form and the motion of the Whole. Just as when one organ of a living being undergoes changes, remote organs are brought into sympathy by so-called "correlation,"³²—so according to such an organic conception a correlation would take place between all different living beings, that is to say, a correlation within the universal manifestation of life. This is a perception which unfortunately we do not possess for the kingdom of life in general; but it will not be for long that it will be wanting, and it will bear glorious fruit. In the meantime Descartes, as you have seen in the previous lecture, has made a beginning in his Symbol of the Æther, and his Schematism of the laws of motion with the organisation of space, Kant and Laplace with the organisation of the world of stars,—and lately Hertz, with his introduction of so-called "unseen masses," and "unseen motions" into mathematical physics, has prepared the way for an organisation of forces, whilst Lothar Meyer and Mendelejef by their investigations into the so-called "periodic system of the elements" have attacked the problem of the organisation of matter.

So much for a preliminary understanding of these conceptions of "Atomism" and "Organicism" as terms for distinct directions of perception.

But there is still a point upon which I must offer a few words of explanation, before we take into consideration the important subject of the relations between fixed Seeing and fixed Thinking. It will no doubt have struck you, and it will perhaps to a certain extent have puzzled you, that Thinking directed inwards enters into a certain relation with Seeing directed outwards, and in the same way Thinking directed outwards with Seeing directed

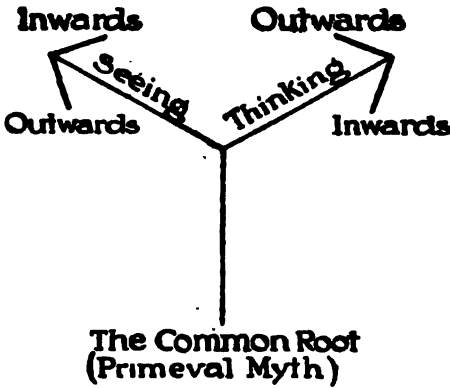
inwards. For the two last, Thinking outwards and Seeing inwards, lead to a plurality (plurality and atomism), and the two first, Thinking inwards and Seeing outwards, end by leading to a strictly unified idea (monism on one side, organism on the other). I think we can explain that well to ourselves if we abide by our diagram of inwards and outwards, and say to ourselves, Thinking directed inwards is a purer Thinking, that is a Thinking less dependent upon Seeing; Seeing directed outwards is a purer form of Seeing less permeated with elements of Thinking; the opposite holds good with Thinking directed outwards and Seeing directed inwards; hence the relation between the apparent contradictions. The man whose Thinking is directed purely upon the introspection of his own self, his *Atman*, strictly speaking, sees no unity, but only the organic unity, *κατ' ἐξόχην*, that by which indeed all is brought into union, the Ego, the whole activity of which consists in the constant reconstruction of unity, for which reason we are justified in calling it the "organising unity": on the other hand, it is only in the first instance that the man whose vision rests purely upon nature perceives plurality; but if this gaze of his remains constant, then the seer will behold, not indeed an inner, but an outer unity, the organised unity of which we spoke just now. The organising unity is that which Kant called the "unity of apperception," the unrealisable inner Something through which all perceptions and all Thoughts are drawn together into a single central point, and only the idle word-splitter will forbid us to call this central point—which is metaphysical and yet the author of all reality,—by the name of Ego. Organised Unity is that "Nature" which could not exist for us at all unless everything stood in relation to everything else, thus creating one complete and consistent form. It needs an intensive esoteric manner of thought to realise the organising unity as the Indians did: it would demand a

passionate devotion to nature, striving as Goethe strove, in order to perceive the organised unity everywhere. That is the goal to which those two roads lead, the Thinking directed inwards and the Seeing directed outwards, and therefore they possess one common criterion, unification. That method of Thinking, on the contrary, which, as in Aristotle, is turned towards perception without possessing the pure force of true Seeing, necessarily remains enmeshed in manifoldness and plurality, and that method of Seeing which as in Democritus turns towards Thinking, must necessarily be inclined in accordance with thought to individualise the plurality which it holds, that is to say, to create atoms, "indivisibilities," In-dividuals, which all stand side by side immutably, and only mechanically come into relation with one another.

Now we come to the most important use which we can make of our Scheme, that is to say, to the investigation of the different connections which are possible between Thinking and Seeing in a human brain.

It may happen that the man who Thinks outwards may also See outwards, as for example is the case with Aristotle, or yet it can happen that the man who Thinks outwards may See inwards, like Newton and the majority of our investigators of nature; and in the same way Thinking directed inwards can be united to Seeing inwards or Seeing outwards. This gives rise to a rich manifoldness; for as, on the one side, all specific Thinkers constitute a group of men in relation to one another, contrasted with the specific Seers of the universe; so the Seers who, like Goethe, are possessed of a method of Thinking which is directed inwards, are more nearly related in many ways to those specific Thinkers whose Thinking, like that of Bruno, is equally directed inwards, than these are to those whose Thinking is directed outwards. So, for example, a Bruno, in so far as he is an extreme Thinker,

is certainly more closely related to the Thinker Aristotle than to the passionate Seer Goethe ; on the other side, it can be shown that Bruno in certain relations stands nearer to a Goethe than to an Aristotle,—indeed that he is actually a blood-relation ; and that arises out of the fact that Goethe's Thinking is directed inwards exactly like that of Bruno,—that of Aristotle, on the contrary, is directed outwards. The systematic discussion of a series of examples will make that quite clear to you. But before going over to that let me add one more word



about our diagram—for here too perception renders yeoman's service to Thinking.

Here in the middle we have "the common Root" as Kant calls it: we have allowed Thinking to branch to the right, Seeing to the left. I think that in order to delineate our diagram correctly we must draw that method of Thinking which tries to escape from Seeing and bends back upon itself, as pointing downwards, in the effort to reach the common root. We must act in the same way with the Seeing which is directed outwards. We thus give expression to the fact that these two extreme directions are, as we have already briefly stated,

in certain relations striving against one another. On the other hand, the Thinking which is directed outwards and the Seeing which is directed inwards must be so drawn that they visibly leave the common root, and then incline towards one another. Here we make directly perceptible that which it would otherwise be difficult to make comprehensible : that is to say, how far the inner Thinking and the outer Seeing, although far removed from one another, still stand symmetrically in relation the one to the other, and in a certain sense travel in the same direction,—as in the same way do the inner Seeing and the outer Thinking. But there is more yet which may be gathered from such a graphic Scheme provided that it be correctly drawn. For example, our Scheme shows you at once that out of the connection of Thinking directed inwards and Seeing directed outwards extraordinarily wide and harmonious personalities must presumably proceed, for this is patently the most comprehensive of all possible outlines : out of the connection of Thinking directed outwards and Seeing directed inwards, there will result in the same way relations harmonious and strong, but probably specially limited intelligences : as against which the two cross connections, in which both parts are directed outwards, or both parts are directed inwards, promise us very rich but in a high degree contradictory natures, since tendencies which are fighting against one another are united in the same brain.

You will see the practical use of this manner of observation if I now name a few examples ; and here I will in the first place furnish you with a cut-and-dried list in order that you may retain the different names, whilst I add a few explanatory remarks. In the first place I write down the different possible combinations, and then on the left set as examples the names of philosophers in whom Seeing is preponderant, on the right those who are in the main thinkers.

Goethe	{ Thinking inwards Seeing outwards }	Schopenhauer.
Democritus	{ Thinking inwards Seeing inwards }	Bruno.
Descartes	{ Thinking outwards Seeing outwards }	Aristotle.
Newton	{ Thinking outwards Seeing inwards }	?

You see above we have, where I have named Goethe and Schopenhauer, the broadest intellect which we can imagine: Thinking directed inwards, Seeing directed outwards.³⁴ Below, on the contrary, stands the narrowest thinkable intellectual aptitude: Thinking turned away from Thinking to Seeing, and Seeing turned away from Seeing to Thinking; that is to say, Thinking which is not pure Thinking and Seeing which is not pure Seeing: whether any master-thinker ever possessed a talent of this kind, I should be inclined to doubt, at any rate I can name none; and yet this is the ground upon which Newton and almost all natural science stand; I look upon this position as the strongest that the average man can occupy. Between these I have inserted the two intellectual aptitudes out of which the greatest part of what is in the scholastic sense commonly called "philosophy" has issued. Thinking and Seeing, both inwards, or Thinking and Seeing both outwards: we shall see as we go on, wherein the power of these aptitudes for the work of thought lies. We will now look more closely at each one of these great intellects from the point of view of our Scheme.

From our first lecture we learnt the preponderant power of Goethe's eye; seldom has the world had any experience of so pure an eye, that is to say, of one so entirely directed outwards. Therefore it is the relation

of things to one another and their combination into an organised Whole that he sees everywhere. "An inner and primeval community of all organisation is the foundation": that is his creed: it is as you see the doctrine of organicism,* as I have called it, in its perfected form, "the community of all organisation." Pure Seeing can judge in no other way, and it is laughable to assert that the man who all through his life so passionately fought against the atomist Newton, would, if he were alive now, sing pæans in honour of the atomist Darwin. His very doctrine of colour, as I showed in the second lecture, is a piece of constructive work, and that means nothing else than an attempt to follow the organisation of Nature, instead of breaking up nature into a mechanism of infinitesimal particles, after the manner of our scientific optics. Such then is Goethe's method of Seeing. Goethe's method of Thinking, on the contrary, is oriented inwards. Hence the mystic inclinations of his youth and the misunderstanding which led to the fuss over Spinoza: hence the tendency to grow quite blind in the after-feeling of religious ecstasy. "My soul has only antennæ and no eyes: it gropes its way and does not see."⁸⁵ Hence the assertion: "I was born in the school of identity," that is to say, in the school which must deny every separated individuality, in opposition to the poet's own words:

Es gilt, man stelle sich wie man will,
Doch endlich die Person—

"one may place oneself as one will, in the end it is personality that counts."

Hence the inspiration of the soul which comes to the front from every nook and corner, "Nature is to the very core divinely alive" (*Letters*, I4, 8, 12), an intellectua

* *Organicismus*. A word coined by the author in order to express the notion that a special theory is implied. *Organism* would represent something concrete, and would not give the author's meaning.

character which sometimes transiently seduces him into errors of natural philosophy: hence the abstract scholastic doctrine "Life is the rotatory motion of the monads round itself."⁸⁸

This comprehensive talent,—Thinking inwards Seeing outwards, is I believe, fairly rare. Exclusive of Plato and Kant, whom I leave out at present for reasons to be given hereafter, Schopenhauer is probably the best known example among the famous thinkers; as an expressed antiatomist and equally expressed monist, he belongs unquestionably to this class. Had Schopenhauer been merely a promulgator of the mystic unity, rechristened Will, he would not have been able in direct contradiction to the Indians whom he so often invokes, to produce the most brilliant writings which ever flowed from the pen of a philosopher,—instead of formless stammering attempts at expressing that which it is impossible to express. That was the result of the Seeing outwards which shows him as closely related to Goethe. For perception alone furnishes our phantasy with material; but the nature of the thing involves the fact that the pure, and especially the intensive inward, thinker, generally sees little and is hardly more than a dialectician; you see that in the Indians, whose philosophical writings, the further they are removed from the *Rig-Veda*, become more and more poor in the power of making themselves clear: you see it in Aristotle, who at every moment loses himself in mental tangles in which no man is able to achieve a thought, because hardly a trace of perspicuity remains; it is those who perceive that lend material to philosophy, and here too you have at once an example to your hand; for if Descartes bears the title of "Father of Modern Philosophy," he has earned the name less by the metaphysical mental work, which he has given us, than by the enormous material for perception which he has created for us. Schopenhauer is to a certain extent

a Brahman gifted with Eyes : all his life he showed a passionate interest and deep understanding for the organic sciences (the inorganic sciences were remote from him on account of their more abstract nature), so that he has the power not only like the Indians to look upon organism as the objectification of Will, but, as the Indians never could, to follow this organism in many particulars of its manifestation. That is why the most abstruse philosophy which ever was invented by mankind gains fresh life at his hands, and becomes so fascinatingly interesting that even our most frivolous worldlings read these volumes. And just because he with his Seeing directed outwards is a specific thinker of the first importance, he avoids falling into Goethe's mistake of seeking salvation in the abstract monads, which he declares are "a monstrous identification of two nonentities."

A special distinguishing mark of this rare form of intellect, born of the amalgamation of Thinking inwards and Seeing outwards, is the direct juxtaposition of apparent contradictions as well in thinking as in character: that is as true of Goethe as it is of Schopenhauer: in Goethe, for example, the ecstasy of the poet cheek by jowl with comparative osteology, in Schopenhauer physiological acumen in the phenomena of life, with the belief in magic and spiritualism.

The relationship which our tabular statement reveals between Democritus and Bruno has now and again struck the more discriminating observers, still I do not think that it has as yet been traced back to its origin. Windelband, for instance, believes that he can discover in Bruno from his youth up the germs of two opposite "tendencies," and considers that the one comes to the front most in one half of his life, the other in the second half;⁸⁷ an essentially correct observation which distinguishes itself advantageously from the attempts forcibly to banish out of the world the many contradictions in

Bruno, and also from the usual phrase of a "development," by means of which the original monist by degrees quietly became an Atomist. Windelband saw more keenly here than most of his colleagues. Still it remains a riddle for the reader how it can have been possible that apparent contradictions should have germinated in the brain of a great thinker at the same time. In truth there is no contradiction between Monism and Atomism, at any rate no organic contradiction, but at the most, so far as I for my part can admit, a logical contradiction. Monism, in which the soul is all in all, is a thought, Atomism (mechanism) is a perception even though it should only be an abstract perception. And these two men of genius, Democritus and Bruno, are sufficient proof that a Seeing inwards may well exist together with a Thinking inwards, and as a consequence Monism with Atomism: it is certainly no inharmonious condition even if, as our diagram shows, we may expect tolerably steep difficulties to cross over.

Bruno

Now let us look at Bruno.

It is impossible to imagine the soul having greater power than it has in him. *Sono tutte le cose animate . . . sia pur cosa quanto piccola et minima si voglia, ha in se parte di sustanza spirituale . . . perche spirto si trova in tutte le cose et non è minimo corpusculo che non contegna cotal portione in se che non inanimi (De la Causa, p. 236)*; that the stars revolve in their courses is not the result of physical causes, but happens because these *piu divini animali dell' universo* choose to revolve (*vult animæ vis moveri*); their movement is the symptom of their life.

*Hic etenim effectus vitæ est, vitæ hoc quoque signum.*²⁸

And his monism is just as unqualified; for these souls are not many souls but one soul: *anima ubique est una; l'anima del mondo . . . è tutto in tutto; onde al fine (dato che sieno innumerabili individui) ogni cosa è uno et il conoscere questa unitá è il scopo e termine di tutte le*

philosophie e contemplationi naturali. And yet as soon as Bruno, from his youth up—(be it remembered that he disappeared at the age of 42)—begins to See rather than Think, he becomes an Atomist, and that because he cannot do otherwise, because his Seeing is never purely directed upon the phenomena of nature, but is always a mental Seeing, and mental Seeing leads to Atomism as inevitably as Thinking without perception leads to Monism. And so with the dogmatic keenness which is peculiar to him he declares that the man who ignores Atoms can make no magnitude intelligible: where there is no indivisible unity there can be nothing; all investigation of nature must proceed from the Atom,³⁹ consists of observations of the Atom, and ends in the science of the Atom.⁴⁰ So you see Bruno is at the same time a dogmatic Monist and a dogmatic Atomist.

The position of Democritus follows on corresponding lines. I need not waste words over the Atomism of Democritus—he is known universally as the inventor or, at any rate, as the perfecter of the doctrine of atoms—nor do I need to argue how much more realistically, more concretely, and more visibly the atoms appear to him than they do to Bruno; his intellectual aptitude is responsible for that, inasmuch as it starts with Seeing, whereas Bruno was and remained a scholastic Dialectician. Our histories do justice to the specific Seeing of Democritus: the same cannot be said of his Thinking: there is, on the contrary, as it seems to me, much misunderstanding upon the subject of his doctrine of the soul, and that because under the domination of Aristotelian-religious dualism, we have unlearned the art of doing justice to Ideal complexes which are altogether differently constituted. When we men of to-day hear the word soul, we think of something utterly separated from all corporeal manifestations,—the *ψύχη* of Aristotle, and the *Pensée* of Descartes opposed to all expansion. How could any true monism

e purely expressed within such a mental Scheme as this ? When Democritus says that even the soul consists of Atoms, he must be taught by Professor Zeller that such a soul as that is really no soul, but only "the material of which souls are made": to which is appended the further deep remark, "spirituality is considered by him not as the power over the whole material, but only a part of the material." Such a reproach would certainly start Democritus in an outburst of his proverbial laughter, and he would answer: "Most honoured Geheimrat, all respect to your immense learning! But inasmuch as I, like my predecessors the Brahmans, my contemporaries the Eleatics, my followers Plotinus, Bruno, Hegel, and many others, found it more correct and to myself personally more tolerable, to explain the world as consisting of one principle, and not of two or more,—what could I or any other monist do but regard matter as spirit or else spirit as matter? And as Seeing was my starting-point I preferred the latter alternative." This one reproach of Zeller's suffices to give us an insight which is as bright as day before our eyes, and yet one which in the dust-storm of learned discussions no one sees, namely, that Democritus was fundamentally a monist, not of course with the dogmatic keenness of a Bruno, and yet quite as clearly so, since he rejected all dualism. Aristotle saw that right well when he said of him, "the man who assumes a single substance also assumes a single soul—not several souls."⁴¹ The words Soul and Matter lose their absolute significance as soon as only the One is assumed; a minimum of philosophic knowledge should suffice for this insight. It is the same with the ideas of Democritus as to the Godhead. Schwegeler tells us in his unfortunately still much-read manual that "unity, the spiritual bond of the universe, was lost" in Democritus, and as a punishment he puts him back a hundred years, behind Xenophanes! In Zeller as with the rest we are everywhere

told that the wicked man was an Atheist. The truth is that he taught the importance of the soul as all in all, and a divine nature, like Bruno and like Goethe. He held that all the forms of the earth consisted one half of soul (the *animus* of Lucretius); he was wont to call the human body a tent, a mere night refuge on a journey. And if he energetically threw aside the extra-mundane *Nous* of Anaxagoras, he still held that the Divine "dwelt in all things."⁴²

To me this comparison between Bruno and Democritus seems to explain much. Democritus, the investigator of nature, atomises everything, even the soul; Bruno, the abstract philosopher, in spite of his *poco curante* doctrine, finds himself compelled to accept the Atoms,—but he endows them with soul, just as he had done the stones, and so becomes the regenerator of the neo-Platonist monads. These two intellectual achievements, the atomisation of the world, including the world of the soul, by Democritus, and the endowment of the atoms with souls by Bruno—thus referring them to one single primeval monad, God,—arise from a nearly related intellectual aptitude; Seeing inwards in combination with Thinking inwards; only that in the one case the philosopher sees more than he thinks, in the other thinks more than he sees. This mental tendency is, as I think, hardly rare, only it does not seem easily to further results of the very highest order; in the nineteenth century we might name Fechner as the representative of Seeing in this fashion, and Lotze as the representative of the more abstract Thinkers. It is true that Fechner speaks of a cosmic organism and so forth, but that is quite in a different sense from that of Kant and Goethe; the unity is with him a thought, not a perception; when it comes to perception he is a dogmatic atomist, and builds his whole representation of the world upon the acceptation of forces working at a distance.⁴³ In Lotze as in Bruno we have

mechanical atomism pushed to the extreme, bound up with the doctrine of monads and the universal endowment of soul,—everything that is real is spiritual.

Of even greater importance for the history of human thought is the other one-sided intellectual aptitude; **Thinking outwards and Seeing outwards.** The equations which proceed here between Seeing and Thinking seem to be in all cases rich and full of living power. For a man who Sees outwards like Descartes, whom we have named in our diagram as a pre-eminent representative of this tendency, instead of contenting himself with the barren insignificance of the formless atoms; feeds his phantasy with ever new superhuman nourishment, and the Thinking which is directed outwards, which associates itself with Seeing, does not immediately sublimate everything back into the formless primeval unity,—as is the case with Thinking directed inwards—as in Goethe, for example,—but consolidates it, perhaps artificially, perhaps high-handedly, and yet practically. If, however, in such a man it is not Seeing but Thinking that is preponderant, as in our example Aristotle, then we see that this man also has an open eye for the facts of nature; he may force the facts by the assumptions of his intellect—but at least he leans upon them for support; and because his eye preferentially sees that which is organic, so in his Thinking he will organise and create form. In both cases we may expect systems of philosophy that shall be firm, broadly designed, often dogmatic, but consistent.

There is no need for me to exhibit Aristotle as a man whose Thinking is directed outwards; he is the pluralist *par excellence*; he is always dissecting. Still, when I use the word dissect, I must at the same time point out that he does not dismember: remember that the mere idea of atomism signifies a destruction of form: the atoms are not a mere thought-analysis of that which exists, but its practical dissolution; that is why the abstract monist

so easily harmonises with this view which we praise as concretely natural-scientific, and teaches with Bruno: *ogni volto, ogni faccia è vanità è come nulla*, every countenance, every special form is a vain nothing. Very different was Aristotle. For him it is precisely form (*μορφή*) by means of which a thing enters into the daylight of Being (*ἐντελέχεια*) out of the night of non-existence (*στέρησις*). The whole of his achievements in the domain of pure thought (Logic, the categories, and so forth) is a taking to pieces with a view to reconstruction. But that his view of Nature is purely directed outwards you can gather with certainty from the one symptom that he is a declared antiatomist. Here the position of Aristotle is the exact reverse of that of Bruno. Bruno maintains that the universe has no bounds, that it is absolutely infinite,⁴⁴ but, on the other hand, looking downwards there must be a boundary, for if there were no atoms there could only be nothing. Aristotle's teaching, on the contrary, shows that, looking upwards there are real individuals, and that means form, and that again means something which is bounded; and so the world of the stars must have boundaries, otherwise it would be formless, and that means nullity;⁴⁵ but downwards everything is one continuity (*συνεχής*), and therefore boundlessly divisible.⁴⁶ These two primary ideas of Aristotle, the individual and the continuous, arise, to hold by our formula, out of pure Seeing outwards: they form the exact contradiction of the universal all-one and the atom.

In the same group on our table, but with preponderant insistence upon Seeing, we find Descartes. In Descartes no one will question the fact that the Seeing is directed outwards: he organises space: that is the aim of his *Principia*. Like Aristotle, he is a deadly foe of the Atoms, of empty space, and of the forces working at a distance; that is to say, he is a representative of the

organistic-dynamical standpoint in opposition to the atomistic mechanical.⁴⁷ And here you must take care not to stumble against a stone of offence, for you have already heard that Descartes looks upon all living beings as "machines," and now we see that he is a sworn enemy of the mechanical school. You must accurately understand what it is that Descartes means by machine. Just because in Descartes not Seeing alone but Thinking also is purely turned outwards, he is the bluntest dualist that ever lived: Aristotle does not come up to him in this. Now this Seeing combined with this Thinking necessarily leads him entirely to distinguish the so-called intellect—*prana, vâc, pneuma, psyche, nous, logos*, etc., from concrete nature. The Monist, if you watch him closely, will always try to smuggle in a second idea, while the strict Dualist, Kapila in India, Descartes in Europe, maintains a perfectly "pure nature," if I may so express myself, and can therefore far more consistently treat her as monistic than the true monist, who has always something of the *Janus bifrons* about him. So it comes to pass that Descartes' natural science is out and out materialistic, as all exact science should be; it is true science as we became acquainted with it in the second lecture, and in contradistinction to Goethe's perception of nature. And this science can proceed in no other way than according to Kant's maxim: "I must always reflect upon all forms in material nature in accordance with the principle of the mere mechanism of nature, and so far as I can investigate it, because unless we base the investigation of nature upon it as a fundamental principle, there can be no true knowledge of nature." (Ur, §70.) That, however, gives rise to some misunderstanding; for we pay too little attention to the fact that the conception "mechanism" occurs in two different senses. The man who accepts atoms and empty space believes that through the union of atoms, whether necessary or accidental, transient forms come into

being which consequently are only a manifestation of the fundamental movements of infinitesimal particles, and are therefore also of subordinate importance, which is the distinctive mark of all our atomistic science ; but the man who, on the contrary, assumes a space which is filled explains all movement within it as conditioned and required by form. The difference corresponds pretty nearly to that which is established in physics between Kinetics and Kinematics. Kinetics investigate the movement of causative powers, with respect to the masses of bodies, etc., and are of their essence arithmetical. Kinematics investigate the reciprocal positions of different parts, in other words the form of a Whole, and the movements which necessarily result from it, and are consequently essentially geometrical. From this comparison it is perfectly clear how far the one comprehension of "machine" may be abstract, the other concrete—the one a mere thought, the other a perception. Descartes under the word "machine" understands something concretely perceptible. If he speaks of machines with reference to living beings, he means thereby that he needs no intellectual principle, no soul, for the explanation of what takes place in nature, but confines its phenomena to a completely isolated domain, whereby he not only fundamentally rejects the spiritualist, but above all the scientific monist, who everywhere brings in the Soul. We must unconditionally admit that Descartes' machines are even more "mechanical" than those of a Democritus, a De la Mettrie, or a Ludwig Büchner: at the same time we must lay stress on the fact that the idea is a different one. Here philosophies differ in spite of a manifold common terminology. In this case the criterion is very simple, even though it should require the accurate knowledge of a thinker to apply it with certainty. In order to distinguish machine from machine, it is only necessary to ask

oneself : does this philosopher consider organism to be a machine, or is the machine in his view an organism ?

That is as much as need be said about Descartes' method of Seeing. His dualism is proof enough that his Thinking also was directed outwards. He certainly never possessed the stiff one-sidedness with which he has been accredited ; just as much as Kant he admitted the possibility of a " common root " :⁴⁸ but he saw the immense advantage that perception as well as thought would derive through being scrupulously separated from one another. Consistent materialistic science is impossible without dualism ; without it the Ego fades away and with it we lose the last point of support,—the *si fallor sum* of St. Augustine, the *cogito, ergo sum* of Descartes,—without which it is utterly impossible for us to speak scientifically of a world and of knowledge of the world. On the other hand, after Descartes had taught us clearly to distinguish between thought and expansion, the old familiar equation between Thinking and Seeing could never again be maintained with its unsophisticated effrontery.⁴⁹ It was thanks to this splendid man that natural science threw off the shackles of the Socratic adulteration of reason and teleology ; and thought, freed from the servitude of a monstrous natural symbolism, was now guided on the road to criticism.⁵⁰

One word more before we close our observations upon this interesting intellectual character. The immense influence of an Aristotle and a Descartes upon the thought and investigations of Europe is openly manifest, but none the less have these very men been passionately attacked in all times, and indeed often by the best intellects. In order to be thoroughly aroused, philosophy and the investigation of nature were forced energetically to shake themselves free of Aristotle,—all stood up against him—the monists, the dualists, the mechanists, and the dynamists ; how Descartes was treated on all

hands I have set out in the previous lecture. It seems to me that this is accounted for in the following way. There is something violently arbitrary in this disposition to comprehend nature purely as nature, and Thinking also as nature. I hardly know whether you will understand me if I say that by this direction of thought the road to Ideas is blocked, that is to say, to those Ideas with which our first lecture, calling in Goethe as a support, dealt with, and which as Kant puts it beam back upon us out of the *focus imaginarius*. But it is just these ideas that are the true parents of Thinking in relation to Nature: it is here that the myth is born, the myth which expresses pure Truth, a Truth that never could have been inverted, like Goethe's Metamorphosis and Kant's Freedom,—whereas Thinking which is directed severely outwards rather analyses than observes, and rather organises than gives life. Goethe the great Seer, perceived that in full clearness without, however, having brought it together into a systematic connection. He complains that in Aristotle—the architectural man as he calls him—the comprehension at once reaches empiricism without any intermediary;⁵¹ I think you must understand by now how in a thinker with such tendencies it could not be otherwise: it is only a bold leap that can lead from Thinking outwards to Seeing outwards. You have seen what pains Aristotle took to act as intermediary between God and the World: he met with but scant success. Of Descartes, who in contradistinction to Aristotle started from empiricism, Goethe opined that he did not succeed in finding the connection with comprehensions. “He seems to be lacking in imagination and elevation: he finds no intellectual, living symbols, in order to bring near to himself and to others phenomena which it is difficult to express. He makes use of the crudest mental parables in order to explain that which cannot be grasped, even the incom-

prehensible."⁵² That exactly hits the mark, and from the same standpoint as in the case of Aristotle, only that the one stands on one bank, the other on the other bank. And so we all of us as thinkers and investigators come to rebel against these two men in both of whom Thinking and Seeing are directed outwards. Architects they are, but they set to work with their materials crudely and arbitrarily; they are wanting in the keenness and consistency of the Democritus-Bruno group (Thinking and Seeing inwards) as well as in the premonition and gentle intuition of the Goethe-Schopenhauer group (Thinking inwards, Seeing outwards) and the compact logical exclusiveness of the Newton group (Thinking outwards, Seeing inwards), at which we are now arriving. Still, they do not allow themselves to be finally routed and pushed on one side; for we can dispense neither with the organisation of thought, nor with the organisation of that which is perceived, and no one is so fitted for such organisation as these two very men.

One combination still remains to be spoken of: that of Thinking outwards and Seeing inwards. This is the true disposition to natural science; the method of perception which results from it is reckoned by investigators of nature as of almost dogmatic value, and so far science has fared well under the limitations thus tyrannically imposed: every rebel has succumbed. I have already shown how here the two-sided limitation is the principle of intellectual life; it is also shown by our scheme-diagram. Thinking in this case does not in any way reflect upon itself, but addresses itself only to that which is perceived: but Seeing only takes count of so much in perceived nature as associates itself conveniently with Thinking; all the rest it passes by with closed eyes. As Goethe says so pointedly of the investigators of nature: "in such people everything quickly turns inwards." This process of Seeing and this process of Thinking we

studied in detail in the second lecture in the example of physical optics. It is anthropomorphism in its highest potentiality, for here we only think of what can reach the brain through the senses—the whole world of the invisible remains unobserved—and perception only takes place in such a manner as the mechanically combining logic of the human brain chooses,—the whole world of that which is truly visible remains equally unobserved. Here all wisdom rests upon the needle-point of the Anthropos and his special interests. Still, I would call attention to the great power which lies precisely in this. In Thinking which is entirely directed upon Seeing there can be no empty thoughts. In Seeing which is entirely directed upon Thinking “blind perceptions” are out of the question. Here everything is to the purpose, each part fits exactly into the other, it is the perfection of equilibrium.

As for what concerns the specific Thinking of the investigators of Nature, it is to be observed that in most cases they content themselves with a minimum. I have already called attention to the special limitation in Newton's thinking, and have shown how advantageous this limitation was for the work which he had in hand. Much might be said about the difficulties which many of the most important investigators of nature, indeed we might say the majority of them, experience in understanding philosophical thoughts, even the formulation of the question upon which all philosophy is based; it is a melancholy chapter, for in consequence of this shortcoming the just respect which famous investigators enjoy among us has at the same time led to a widespread philosophical dullness, which is in its turn a great danger for the universal position of culture. That even a Helmholtz should have shown himself to be utterly incapable of really understanding the aim and methods of Kant's critical investigation of the human intellect, is the fact that I have

already discussed, referring you to Classen's irrefutable arguments. What are we to say of Lord Kelvin whom years ago Zöllner attacked on this point, and of all the so-called English natural philosophers in a body? I prefer to call attention to a last new example, the chemist Wilhelm Ostwald, for we cannot afford to pass over in silence the incurable limitation of this order of thought.

Every friend of science honours the name of Ostwald. Out of the chaos of chemistry, Ostwald has known how to construct a perspicuous erection, and his little book, *Wissenschaftliche Grundlagen der analytischen Chemie* ("scientific foundations of analytical Chemistry"), is the delight of all those who, like myself, have had to build up their knowledge of chemistry in the laboratory out of a thousand disconnected fragments, without a trace of any intellectual bond of union. This learned man, whose methodological talent is so pre-eminent, has recently gone over to philosophy. Of his "lectures on natural philosophy" in which he develops his own philosophy, I will say nothing; that would lead us too far: but he is now publishing a periodical, *Annalen der Naturphilosophie*, and the first number is adorned by a special critical study of Kant. What is offered here surpasses all imagination. Listen only to the following sentence: "to Kant's leading question, how are synthetic judgments possible *a priori*? we answer, judgments *a priori* are indeed impossible, and all knowledge arises out of experience."⁵³ Pray do not take alarm at the expression "synthetic judgments *a priori*": we are dealing with something which the properly trained man can easily grasp, and for which Kant, as was his wont, used a scholastic term; the whole conclusion of our lecture on Descartes has shown you that in order to perceive things, there must be a form of perception,—and the same is the case with thought—so that as Kant says, there must be "conditions of experience"; it is to this

that the somewhat irritating expression "synthetic judgments *a priori*" refers. Sometimes Kant substitutes for it the more descriptive word *erweiterungs urteile*, by which it is implied that we add to the perception something more than the perception itself contained, before the so-called experience comes into being. For the moment, however, the remark will suffice that the one and only question out of which the whole *Kritik der reinen Vernunft* arises, is this, How is experience in general possible? That all knowledge arises only from experience, that is the impregnable conviction for which Kant gave his whole life; he maintained this view against a whole world of theological prejudice and Aristotelian scholastic dogmas of reason, and at the same time he brushed away the insufficient, halting, metaphysically unsatisfactory attempts of Descartes, Locke, and Hume; he is the first and only one who taught and proved that all knowledge springs from experience; he it is who once for all deprived of their deceptive brilliancy the *lume interno* and the *divino sole intellettuale* of Bruno⁵⁴ and his modern partisans, and in the place of all so-called inner illumination substituted the dictum "all recognition of things out of pure understanding or pure reason is nothing but mere moonshine, and only in experience is there truth." (P. Anh.) But here it is necessary to make a distinction. For if by experience we understand only pure empirical experience, only the evidence of the senses without any intellectual assistance, then obviously we can by these means alone arrive at no clear perception of anything. Of experience so understood Kant says on the very first page of the *Reine Vernunft*: "But although all our recognition may begin with experience, still it does not all spring out of experience. For it might well be that even our recognition of experience might be a compound made up of what we receive by impressions, together with what our own power of recognition, merely following

on impressions of the senses, automatically gives out,—an addition which we do not distinguish from that fundamental material until long practice has made us careful to observe it and clever at defining it." I refer you to our first lecture (p. 86 *seq.*), where I gave you detailed information upon this, and showed you that we might quite justly call *The Critique of Pure Reason* the "preparatory school of experience." And now comes our bold chemist, and *thinks himself compelled to aver against Kant* that all knowledge originates in experience! That is just what has got to be proved and what can only be irrefutably set out by a systematic metaphysical analysis of experience,—a dissection of every apparently simple experience into its component parts, and an exact following up to its origin of every component part, that is to say, a complete exposition of the proceeding of our human recognition. "The most difficult part of all criticism is the analysis of experience and the principles of the possibility of the latter,"—so writes Kant to his pupil Beck. (20. 1. 1792.) It was for this,—for the sake of the proof, only to be gained by an analysis of experience, that all knowledge without exception comes from experience, that Kant wrote his critiques. And in them he shows with mathematical precision that what is called experience, could in no way come into being, unless our intellect were organised for the pronouncing of fixed judgments,⁵⁵ through which unity is first achieved between the numberless meshes of perceptions (just the judgments *a priori*): and from that he at once deduced that these very judgments can only be used for perceptions, and have no in any way qualified significance outside of the domain of experience. So that he asserts with apodictic certainty: "unless we begin with experience, or unless we proceed according to laws of the empirical connection of phenomena, we make a poor show of trying to guess at or investigate the existence of anything." (R. V. 274.) That

was the blow with which he once for all felled all obscurantism—religious obscurantism and scientific obscurantism. For so long as it is not made clear that the immovable boundaries of our knowledge and thought are given in our own human nature, the door is thrown wide open to fanaticism and dogmatism. Here, as Kant says, “the *nihil ulterius* must be placarded on the pillars of Hercules which nature herself has raised in order to carry the voyage of our reason only so far as the ever-receding coasts of experience can reach.” But now there arises a new species of the exterminated obscurantists; they have left the cloisters for the laboratories, and from thence, in the name of science forsooth, they desire to annihilate the most precious conquests of our whole culture and to replace criticism by a modern dogmatism, the dogmatism of an antimetaphysical pseudo-scientific “experience.” Kant had already exercised his wit upon them; “various natural-history professors of modern times think that they can catch the eel of science by the tail” (Tr. II. Anf.); Ostwald belongs to that class. It is just forty years since that eminent man who was so genuinely a strict empirical thinker, to whom we owe so much, Friedrich Albert Lange, attacked precisely the same narrowness of conception in John Stuart Mill: he showed that Mill never understood what Kant was talking about, since “Kant begins where Mill leaves off,” and very rightly remarked that Mill was perfectly satisfied where for Kant the question, “how is experience possible?” first arises.⁶⁶ But it was of no use; this Thinking that is not pure, combined with Seeing that is not pure, in a systematically one-sided development, breeds a limitation so peculiar, that these people end by becoming practically unable to grasp a real thought. You can read further in Ostwald’s treatise. Anybody with a glimmer of Kant’s aim and achievements, cannot believe his eyes, and balances between ringing laughter and angry displeasure.

I have several times studied the treatise to see whether Ostwald in any passage, I will not say grasped a single thought of Kant's, that would be too much to expect, but whether he ever approximately suspected its true meaning,—whether he ever remarked what it was that Kant actually was speaking of:—the result was negative. And that is the sort of stuff that is written, printed, read, and which whoever wishes to be up-to-date must buy. A deeply mortifying phenomenon! It would not matter if our chemists, like Ostwald, or our zoologists, like Haeckel, were unable to understand the first principles of all philosophy: their own domain is wide enough, and as Kant a hundred and twenty years ago answered an Ostwald of those days, "it really is not necessary that every man should study metaphysics";⁵⁷ still, in a country like Germany, where famous specialists possess such enormous influence, the unhappy dilettantism of these people who leave their retorts and microscopes, in order to develop systems of philosophy in the course of a night, is apt to grow into a cultural danger. So it is here. Kant was a pioneer of freedom; his lifework of criticism is such a fruitful destroyer of all superstition and all historical dogmatism, that Rome itself trembles before this man. But now our freedom, our innermost freedom, the release from the delusions of many thousand years, is once more being cruelly threatened; the enemy is under arms along the whole line. We Teutons have not only subjected the whole surface of this planet to our commerce, but have determined to rise to new ideals, worthy of free men, to ideals purged of Judaism and Egyptology: but how are we to conquer if to the religious fables of antiquity, and the grandiose thought-structures of the clerical philosophers, we have nothing better to oppose than the poor stammerings of the Ostwalds and Haeckels?

So much for the Thinking of the investigators of

nature. You know that there are many who are not of the same mind as these somewhat arrogant spokesmen, indeed that many of our most successful investigators are on Kant's side; one of our most sturdy practical zoologists when he had read Ostwald's above-mentioned treatise threw it into his waste-paper basket, with the indignant cry "philosophical barbarism"! Still, it is striking that the more deeply thinking investigators of nature have rare and small influence upon the ear of the majority of their colleagues, and consequently of the public. A Descartes is more stimulant in philosophy than in natural history, and a Heinrich Hertz remains under the suspicion of his colleagues on account of his acceptance of unseen motions. I think that that is connected with that universal disposition with which you are now acquainted, and which is alone profitable in what is called "exact investigation." The best aptitude for such investigation is abstract Seeing combined with concrete Thinking; manifestly it must be the most unfavourable disposition for all philosophy. You know what electricians call short circuit? Instead of completing its course and, for example, setting alight all the lamps in a house, the electric current jumps from one branch of the circuit to another and goes back purposelessly to its starting-point: as soon as the typical investigator of nature tries to leave the domain allotted to him, this short circuit manifests itself in him: he can neither force his way to the subject either on the side of Thinking nor on that of Seeing, but circles aimlessly round and round inside of the narrowest horizon that can be imposed upon the human intellect. Thinkers after the manner of an Ostwald and a Haeckel, when they leave the ground of their uncontested and unboundedly admirable mastery in order to tinker at metaphysics, may as, it seems to me, be excellently well defined as "short-circuit philosophers."

It is hardly necessary to expatiate more closely upon the method of Seeing in this form of intellectual capacity, for the subject was treated in detail in our second lecture. From that lecture it is possible for us to give a mathematically exact definition of this method of Seeing: it is the manner of Seeing which, as far as possible, is concerned only with the pure form of perception, while, on the contrary, it takes as little notice as may be of the empirical side of perception. Here then we again see the utmost limitation as regards that which is only human, and a fundamental neglect of that nature which is extra-human. There are certainly still sciences in which description plays a dominant part, because it is needful in the first instance to gather up the facts; but the necessary tendency of all exact science is, as already shown, the elimination of the empirical; it is only in that way that it can become "exact." I have already brought to light the special force which lies in this combination of abstract Seeing with concrete Thinking, and I showed it in the example of scientific optics. Here Thinking and Seeing directly join hands, and weave themselves into one another in such a fashion, that the average investigator of nature is quite unable mentally to distinguish between that which is only thought and that which is really seen.

Whether there could be any specific thinkers who could belong to this group seems to me doubtful; I search my memory and cannot name one. It is only in the realm of natural science, only with Seeing as a starting-point, that this intellectual disposition can achieve great intellectual feats, as for example in the case of Newton; the specific thinker, on the contrary, must, one would imagine, at once be suffocated.

We have now come to an end of the analytical examination of our Scheme: I must, however, ask leave to add a few words by way of general orientation.

In the first place let me point out that in this Scheme I have only had in my mind the Indo-Europeans, and even amongst them only those thinkers who elevate themselves to a school of philosophy.

A man like Spinoza, for instance, belongs to another world, and that for one special reason: in him the spirit of mythicism is wanting. Whereas the Indians had taught that the very Gods themselves could not fathom the secret of existence, and Aristotle, with his very positive intellect, made all philosophy have its origin in self-amazement, and go off into countless *ἀροπίαι*, that is to say, questions incapable of solution,—Spinoza recognises no mysterium, he is astonished at nothing, saying expressly that no question rises above the human power of comprehension, and everything can be explained in the most convenient manner (*commodissime explicari*). What is wanting here is that fountain-head of nature out of which not only all mythology, but moreover, all science and all philosophy spring: namely Phantasy. "In the hands of the Semites," says Renan, "the myths are all transformed into flat historical reports."⁵⁸ Here is a case in point: Spinoza is the dreamless man. Let us open Descartes' correspondence. We hear much there of his glorious dreams "which carry him into woods, gardens, and magicians' castles, where he lives all the joys that poets ever imagined," he tells us too how "the day-dreams at his waking become unconsciously fused with the dreams of the night."⁵⁹ Whereas the man to whom the night reveals nothing is incapable of seeing that the morning sun adds to the nightly secret of the true Ego the thousand insoluble secrets of the non-Ego. The man who is dreamless can never understand the men who are rich in dreams. So much the more questionable does it become when the former takes all that is marrow and bone in him from the latter, as is the case with Spinoza: for of his two principal works the one is

entitled *An Exposition of the Principles of the Philosophy of Descartes*, while the other, the *Ethics*, certainly does not bear Bruno's name, but derives all its fundamental principles from him, and demonstrably out of an intimate familiarity with his chief works.⁶⁰ To have brought Descartes and Bruno, the two diametrically opposed intellects, under one roof is certainly an achievement; but it is one in which only a man totally foreign to both of them could succeed,—a man who never grasped their living personality, but only certain formal moments in the texture of their methods of thinking. The mere title of the work on Descartes shows how little real understanding of our philosophers Spinoza possessed: he says that the "Principles" are *more geometrico demonstrata*, demonstrated or proved geometrically. But you know from our former lecture that Descartes, great mathematician as he was, nevertheless saw in mathematics "only the husk of the (philosophical) method," *l'enveloppe de cette méthode*, not the method itself, and that he, like Plato, only recognised in mathematics the significance of a training of the understanding, "of a means of cultivating philosophical thought, and a road leading to knowledge."⁶¹ You know also what was his opinion of definitions and syllogisms, *qui embarrassent en pensant conduire*, and which are only fitted to make what is clear dark, and to block the road to true insight. And now comes a man, and undertakes to adapt Descartes to our taste by beginning every section with a whole series of definitions, axioms, and corollaries; and then strides from one proposition to another in a strictly syllogistic path. And we blue-eyed, fair-haired, short-sighted, *homines Europæi*, stand there gaping, and wonder at the clever, presumptuous Jew, and applaud him for his mishandling of a grand philosophy.⁶²

Much might be added here, but it would take us too far away from our subject: against one thing I must

warn you : do not let yourselves be led away by the persistent preference for Spinoza of our professional philosophers. They are attracted by what is really his chief fault, the logically systematic tendency, the enemy of all living perception, arbitrarily destroying all the contradictions which truth offers. Only see how gloriously Descartes lives his life ! One day he hunts with Wallenstein over the plains of Bohemia, the next day he writes a treatise on acoustics, the day after that a comedy,— one day he constructs a telescope to search the depths of the heavens, the next day he dissects animals to fathom the secret of the circulation of the blood, the day after that he makes experiments upon the weight of air and refraction of light ; one day he discovers the æther, the second day analytical geometry, the third day the Scheme of bodies in motion. That is the life of lives, an unbroken intercourse between Man and Nature. The " noble " Baruch,* on the contrary, from cradle to grave sits in his little back room, thinks over what he has read in Descartes and Bruno, and out of it with incomparable cleverness weaves himself a web of syllogisms. The consequence is that nine-tenths of Descartes' services remain unnoticed by our philosophical schoolmen ; for they do not understand them, they do not belong to their department ; but the further disadvantage is that it leads to their seeing the remaining tenth in a wrong perspective, while no iota of Spinoza's lifework is lost by them. But we may draw this conclusion from it, that here we have before us a man of another race, a sort of Ideal-Rabbi,⁶³ whereas all our own great thinkers, without exception, were men of action : Plato, Aristotle, Democritus, the Brahmans (who were forbidden to give themselves up entirely to meditation before they were grandfathers), Bruno, Leibniz, Bacon, Hume ; all of them work and build with eyes and hands, and are the lords, not the slaves, of Reason.

* Benedict Spinoza. Benedict is the translation of Baruch.

Only a most superficial delusion could lead us astray about Kant in this respect: in his case too, natural science, geography, anthropology, politics, the art of war, were his chief daily food; in his investigations of the mysteries of nature he was more like a Galilei than a Spinoza, and so brought to light more truth than incontrovertible systematics.

But even within our group of nations we must know how to distinguish between men who develop a philosophy of their own, and those who, as so-called "philosophers," only occupy themselves with the technicalities and history of thought; to the latter our scheme is not to be applied. For instance, John Stuart Mill confesses in so many words that he always knew that as an "original thinker," that is as a creative thinker, he was scarcely endowed with the most modest gifts, and was only fitted for abstract science and for the critical analysis of the thoughts of others. He was over thirty years old, as he tells us, when for the first time in his life he began to understand that art and poetry are elements of culture! This thoroughly noble and high-minded man was systematically brought up just as if the object were to make a blind man of him, and we now know precisely why, under such conditions, even the most gifted of men could by no possibility become an "original thinker."⁶⁴

After these caveats against that which is physically and, therefore at the same time intellectually, foreign to us, as well as against much that is really related to us,—caveats necessary to an understanding of the whole—I would fain add yet a few general remarks which may recapitulate and sum up our schematic endeavours.

You will be able clearly to grasp the fundamental difference between the typical Thinker and the typical Seer if you compare the two fellow-countrymen and contemporaries, Socrates and Democritus. Socrates says,

in order to explain nature we must exclusively consult the principles of reason ; Democritus says, in order to explain reason we must exclusively consult what takes place in nature.

There you have the principle. Now if you wish to see the two categories of men at work, you have only to contrast Democritus as Seer, although his Seeing is directed inwards, with Aristotle as Thinker, although his Thinking is directed outwards : in Democritus all notions are simple, palpable, indestructible : empty space, the atoms,—every perception of the senses a matter of touch—all change a combination or a separation—all that happens a necessity—causes of motion the only ones, etc. Whatever form of abstraction plays a part in Democritus, it is still always an abstraction rooted in perception. In Aristotle, on the contrary, the notions are either so endlessly entangled (like that of the substances painfully derived from the motions of the stars), that no man on earth can grasp them ; or else they are so far removed from all perceptibility that nothing remains but almost bare logic, as, for example, in his supreme final aim, towards which everything strives, and the existence of which consists of pure Thinking, but not of a Thinking of thoughts—even in that there would be too much colour—but of a Thinking of Thinking : in the same way in his abstruse notions of possibility, reality, realisability, etc. This is the distinction between the Seer and the Thinker. The following too is interesting : the Seer Democritus does not trouble himself as to whether Thinking can or cannot work with him : an empty space, an indivisible magnitude, a material spirit, are unthinkable : if a man imagines that he is thinking anything in all this, he deceives himself ; these are pure perceptions arising by analogy out of what man sees in nature, namely out of the air-space, the diminutive particles, and the animal world ; in the specific thinker, on the contrary,

reason is the autocrat (p. 330), and he would prefer to adopt a demonstrably false acceptance rather than an unthinkable one. In the construction of the inevitable equation between Thinking and Seeing, the observer of Nature is rather inclined to violate Thinking than Seeing : with the Thinker the reverse holds good ; so long as the matter has the ring of logic, for aught he cares it may in every other way be a nonentity. Violence is a matter of necessity to both : the reason has been shown in the former lecture.

In the case just brought forward we contrasted the man whose Thinking is directed outwards with the man whose Seeing is directed inwards : the contrast of the Thinker inwards with the Seer outwards is even more paradoxical.

The pure Thinkers, the men who, like Bruno, prize the dialectical proof of the eternity of the world higher than the witness of the telescope, and who would prefer to pass sleepless nights in order logically to arrive at a fraudulent conception of the existence of atoms, rather take advantage of this hypothesis of the atoms—a working hypothesis—in order to render some service to empirical science,—these men have for the most part in spite of all a specially lively feeling for nature : they are enthusiastic about her, they are in love with her, they adore her. Of the mystics you know that full well ; but even Bruno, who cannot be numbered among the religious mystics, says of nature :

*Est animal sanctum, sacrum et venerabile, mundus.*⁶⁶

With rapture these men drink in the world-picture in its great as well as in its small and smallest revelations. Plotinus makes a sophist enquire of nature why she works ?] She answers, " because I am a nature that takes delight in seeing."⁶⁶ Such men stand as it were upon a high mountain over against the visible world, and gaze

and look upon it sometimes with extraordinary clearness "The world is a universal figure of the intellect, a symbolical picture of the same," says one of them, Novalis :⁶ does not that remind us of the rising Sun of the Indians in the striking glory of which spiritual illumination was sure to be found? That is why intelligences of that nature are often very precious for the recognition even of the outer world; it is true that sometimes the reciprocal relations of the positions of things and their directions are interchanged, because they see everything in the camera obscura of their intellects; still in that camera everything is rich in colour, sharply outlined, and intoxicated with truth like a dream. That accounts, for example, for the incredible intuition of the Cosmos with which Bruno not only left Copernicus behind him, but even overhauled Galilei and Kepler, who were born after him. Note well too that the extreme thinker sometimes sees the visible world better, and furnishes a truer picture of it than the investigator of nature, who, as every man who has passed the natural-science schools can bear witness, often sees nothing, nothing but his microscope, and his reagents, and formulæ, and calculations and cramped theories. But how often the reverse takes place, how often, I mean, it happens that the man whose Seeing is directed outwards casts a penetrating glance into the inmost secrets of Thinking, is a matter which will not have escaped your observation. The antimystic intellect which starts boldly upon the conquest of Nature, sees itself soon compelled to reckon with a mightily disconcerting adjunct, namely with the Ego, which, like the queue in Chamisso's *Tragische Geschichte* (tragic story) always hangs behind him, turn which way he will. *Nolens volens* he must study metaphysics: in no other way can he reach the shore, or set quietly to work. And so we experience the marvellous fact that it is the opponents of pure thought and of all scholastic philosophy

who cause our whole modern thought to bear fruit, and who act as its guides. Descartes feels a frank antipathy to all true philosophising: "only very few hours in the year do I devote to questions of mere reason," he says of himself (IX, 132); he does it hastily and peevishly, just to be quit of it; he consistently mistrusts the learned studies and exercises of the professional philosophers: *Les formes et syllogismes ne servent de rien pour découvrir la vérité des choses* (XI, 294); the professors are, according to him, "in consequence of their philosophical studies less able to attain wholesome rational views, than they would be had they never busied themselves with such things." Again, "the less a man has learnt of so-called philosophy the fitter he is to understand the true philosophy"—"the more pains he has taken in the old philosophy the less capable he will be as a rule to grasp truth."⁶⁸ The methods in which a Bruno revels, the atmosphere of abstraction and dialectics and hair-splitting which to this day surrounds all scholastic philosophy, are to him repulsive: *nous ne reconnaissons aucun des êtres philosophiques qui ne tombent pas réellement sous l'imagination* (XI, 299). Away with it all! He will have none of it. What cannot be perceived is all a mere jingle of words! A man like Descartes deals with metaphysics solely in order to get rid of them, solely in order not to become a metaphysician. And yet it is just he who gives a new direction to our metaphysics,—he who has illuminated the problem of thought as deeply as Bruno, the dialectician, has illuminated the night of the Cosmos by which we are surrounded.

So much for the pre-eminent Thinkers and Seers in contrast to one another. With reference to the manner in which the equation between Thinking and Seeing is carried out in every single brain, according to the combination which has the greater influence with it, I should like to call attention to what follows.

Actual formation always proceeds from the part which is directed outwards. That is why in cases where both parts are directed inwards there is a disintegration of all form. In Democritus, since he is a Seer, that happened concretely : he laid form in ruins and replaced it by the bodily conceived atoms : in Bruno, the Thinker, matters took an abstract course, he fused everything into a unity of which he had to admit *non é figurato ne figurabile, non é terminato ne terminabile ; non é forma perché non informa ne figura altro, etc.*⁶⁰ Where, on the contrary, both parts are directed outwards we at once find an excessive demand for formation. The informing power of an Aristotle is at once magnificent and fatal : an uncertain outline is intolerable to him, a thing of which it could be said that *non é terminato ne terminabile* would in his view be a monster ; that is why he is the Lord of Schemes ; he gives form to the abstract, he schematises that which is capable of being known, and for that which may not be known he sets up Dogmas. Very similar is the way in which Descartes goes to work, only that in him it is Seeing that is preponderant, so that he finds himself face to face with problems of which Aristotle never suspected the existence : yet the principle is the same ; he is bound to take everything into his clutches, to give form to everything, from the relations between God and man, between expansion and thought, down to the shape of the particles of the æther, and the mechanism of the transmission of light. Such men really produce panoramic pictures, since their power of informing embraces both worlds. On the other hand, it is characteristic of Newton and of the investigators who rally round him, that although they pride themselves upon setting to work on strictly empirical principles, it is Thinking alone which has an informing influence, because thought alone is in them directed outwards ; whereas their Seeing being directed inwards is blind to form ; for which reason

Our exact science according to them might be called *the formation in thought of that which is to the eye formless*. It is a question of Thinking of phenomena, not a true Seeing of phenomena. It observes much, but only with the help of instruments which Thinking, so far as human power goes, has invented, and only by taking for its foundation theories which have the property of at once transforming into thoughts all that is seen. It begins by taking the phenomenon to pieces, and then builds it up again into thoughts. That is what in a former lecture (p. 180) justified us in describing science as systematic anthropomorphism. How ridiculous is the often repeated assertion that our ancestors were "simple anthropomorphists": the man who looks out upon free nature, and feels himself at one with her,—only think of Homer!—is far less of an anthropomorphist than the man who talks himself into the belief that colour is the duration of oscillations. Yet this criticism, however justifiable, must not be allowed to shut us out from the recognition of the fact that no intellectual disposition is so powerful as this forcible packing of man into the central domain, as far removed from pure nature as from the pure Ego, where every thought is concrete and every perception is abstract. The most exact contrast to this is afforded by Goethe, in whom the informing principle, inasmuch as his Thinking is directed inwards, is rooted in the Seeing which is directed outwards: hence the special impulse and power of projecting outwards into the world of the eye ideas to which a clear shape has been given. Since ideas apparently arise in our reason out of a reflection of nature, thanks to the energies of reason from which there is no escape, ever striving to introduce "unity into the special recognitions," as Kant says, that is to say, unity into the manifold,—it is evident that it is precisely a Thinking inwards which always strives for unity, combined with Seeing outwards which clearly perceives the manifold,—

which must lead to working with ideas. If we were to take up again the conflict between Idea and Experience, between Goethe and Schiller, we should arrive at much more exact results. In Schopenhauer the matter presents itself somewhat differently from what it does in Goethe, because the former starts from the standpoint of abstract thought ; whereas in Goethe thought reflects nature as perceived, in Schopenhauer it is nature that reflects thought. But this relationship works wonders for the communication of thoughts, born in the very darkest depths of a reason half unconscious because unimagined, and entirely barren of form : and if Schopenhauer's idea of the Will never becomes really capable of being grasped, but rather lies like a shadowed image upon things, he finds himself much in the same position as Goethe with his metamorphosis, which also floats hither and thither between perception and thoughts. In contrast to the Newtonian principle which embodies all nature in the human intellect, this principle has the tendency to expand the human intellect over all nature. Herein are rooted both the sympathy and the antagonism of the two aims ; a Goethe and a Schopenhauer feel themselves to be passionately attracted and as passionately repelled by empirical science ; they are in just the same position with regard to abstract science. But we who in considering the subject desire to take a bird's-eye view of all parties, recognise in both feelings,—in that of love and in that of hatred,—the symptoms of a certain undeniable relationship between the Goethe group and the Newton group—*les extrêmes se touchent*—while the Aristotle-Descartes tendency, and the Bruno-Democritus tendency, lie apart from both, and in their turn are interrelated to one another. A certain inclination of the Goethe group towards the Bruno group, and of the Newton group towards the Descartes group, need not mislead us, for it never amounts to more than a half agreement.

This last remark is very important for the disentangling of the manifold philosophical systems which cross one another. In connection with our lecture of to-day it leads us to a lesson which will furnish an important conclusion to this excursus, a lesson upon the origin of our mythical ideas.

We know that myths arise everywhere in the equation between Thinking and Being, since only the rainbow bridge born of phantasy pregnant with dreams is able to unite the two shores : but now that our sight has been sharpened by thorough dissection, we observe that this structure of myths embarks upon very different ways in the four chief tendencies which must be distinguished in the human intellect. In regard to the discovery of new myths only those tendencies have any power in which Seeing and Thinking are either both directed outwards, or both directed inwards : the two other tendencies shown in our diagram, Thinking inwards, Seeing outwards, Thinking outwards, Seeing inwards, are certainly as regards a fully harmonious, satisfying, and therefore lasting power of informing, superior to the others ; some are most apt for producing ideal, others mathematical structures ; but so far as true invention is concerned they are weak. A single glance at our general survey scheme (on p. 352) will suffice to convince you on this point. You perceive there the two great primitive myths of Thinking,—Monism and Pluralism, and the two great primitive myths of Seeing,—Atomism and Organism ; from these fundamental perceptions you see the resulting main doctrines of the universal endowment of soul, of the dualism of body and soul, of the mechanical movement of pressure and impulse, of the dynamic movement which is the result of form ; and now pray consider by whom these myths were discovered. Exclusively by men who belonged to the Aristotelian or the Bruno group. Monism and atomism both came to us from

India, the land of those in whom Thinking and Seeing are directed entirely inwards : for pluralism and organism our thanks are in the first place due to the Greeks, to the people in whom Seeing and Thinking were directed outwards. This also holds good of the further systematic development : without Bruno, Aristotle, Democritus, Descartes, we should not possess the same clear view of these conceptions, and these men all represent intellects energetically directed either inwards or outwards. On the other hand, the two other groups gain the mastery of these myths, and by uniting things which originally had no connection with one another, obtain possession of, as it were, a rich building material with which they are able to erect the boldest and most ingenious structures. But for that reason, I mean because in such cases we cannot see the origin of these myths but only their application, we often fail to observe the source of the myth. Nothing has ever made so much use of myths as our modern natural science : even the religions are modest in comparison : unconcerned about origin and connection, it throws all dreams into the common stock, so long as they help notions and thought : the atoms and empty space must make common cause with the space-filling ether and the dynamic first principles : in practice the investigator, without exception, gives the dominant power to the dualistic notion of power and matter ; in theory he preaches monism. We see the same thing, but less clearly exposed to view, in the Goethe group. Thus it is the special characteristic of Schopenhauer's system to be at the same time dogmatic monism and dogmatic dualism : and by this I do not wish to reproach this grandly consistent thinker with inconsistency and to hold up before him the usual bogbear of the profession—the so-called contradictions—but I only desire to call attention to the fact that he would not have been able to construct his own world of thought, and to furnish it with

such fabulously plastic beauty, without these myths proceeding from two violently opposed methods of perception. Goethe does precisely the same with organicism and atomism; his perception of nature glitters in both colours. He so entirely absorbed the notion of organisation that he taught that we must recognise in the whole world of organisms one single interdependency of multitudinous components, and he premises that "we must ultimately look upon the whole animal world only as one great element, where one race either springs or maintains itself out of or upon the other": at the same time he makes use of the opposite notion of the monads, that is to say, of organic atoms, and defines life purely mechanically as the "circular motion of the monads round themselves."⁷⁰ And that which, in such passages, can be proved incontrovertibly penetrates him through and through in every single particular. You will remember how our study of Goethe's doctrine of metamorphosis showed us the simultaneous and the consequent, rest and motion, unity and plurality represented together: that all proceeds from the fact that a man whose being is at the same time directed inwards and outwards attracts to his philosophy twofold myths, twofold equations between Thinking and Seeing. Just as the investigators of nature derive more power from the possession of two-sided capacities, so do men like Goethe and Schopenhauer gain more subtleness and appropriate ideas in what they prescribe by means of the richness and variety of the mythic element, than falls to the lot of the men of the two groups whose minds are directed to one side only. Still—I repeat it—only those men whose direction is entirely inwards or entirely outwards are the discoverers of myths, and even a Goethe could only set up the idea of metamorphosis, because the very word itself and the image of the metamorphosis, as well as the scientific fact of comparative anatomy, were

at his hand, and so only the idea, *quâ idea*, had to master them ; on the other hand, he never succeeded in reducing to a comprehensible image the idea which led him on for forty years in his studies of the doctrine of colour, and so the aim which he had in view remains unknown, and the world only recognises the abstract word " doctrine of colour." There was no lack of the power of giving form, but only a lack of the bold masterfulness which is the characteristic of a true framer of myths.

How much might be added to this ! but I have already spent more time over this excursus than I can really justify : I shall be pleased if it has awakened some of the interest which emanates from the subject. Let me in conclusion remind you of that wonderful verse in the *Kâthaka Upanishad*—

There is one eternal Thinker thinking non-eternal Thoughts. ¹¹

We children of the world of the twentieth century are inclined to reverse the saying of the sage, and say, " There are many non-eternal thinkers thinking eternal thoughts." Special intellectual and sentimental dispositions of distinct racial combinations, climatic and social surroundings, the specially crystallised forms of former religions, and specially the condition of positive science—upon which depends in the first place the mode of interchange between Nature and the Ego,—all this, and more besides, is the reason why the same notions are continually coming to light in new and redecorated shapes : and this very novelty is a matter of congratulation, for it is just that which gives colour to life ; yet we must bear in mind that in the realm of thought, as in the realm of creation, that which may be called development, that which alone seemed of any value to a Hegel and a Darwin, is a mere superficial appearance, in a great measure the craze of short-lived men : the foundation is that which is eternal, steadfast, immovable. If you have

grasped these remarks about the "eternal thoughts," not in the misleading simplification of everything that is merely thought, but with the rich many-sidedness of true perception which comprehends all that is complementary, contradictory and supralogical,—then you are in possession of the first elements out of which there results an understanding of our whole Indo-European philosophy from the *Rig-Veda* to the present day.

And now that we have not only cleared the way for our work upon the difference between criticism and dogma, but have also travelled over a great part of the road, we may draw a line and proceed to the contrast between our two Heroes, the dogmatist Bruno and the critic Kant.

You will, no doubt, have noticed that in this excursus upon the history of philosophy there are two great philosophers whom I have not named, Plato and Kant. It must not be supposed on that account that these thinkers could not with full confidence be included in our Scheme ; but they stand on a higher stage of circumspection than all the other philosophers : in virtue of that they as it were grow outside the bounds of personality, and so instead of the usual human superficial portrait there arises a perfectly plastic, outstanding form, which we can see all round and view from various sides, and in various, symmetrical and yet essentially different aspects,—and that because these men themselves possessed the power to conquer the inborn preponderating influence of an intellectual capacity which tolerates only one direction, to break up the matrix in which every man is cast by nature, and so to set themselves free from their congealing surroundings. In this relation, that is to say in regard to personal intellectual freedom, Aristotle is just as great a falling off after Plato as Hegel is after Kant. The successors of such men as these, supposed to be carrying on and amplifying their work, have just the effect of

veiling that which is incomparable in their personality, and so hide them from our eyes. All the material of life which we find in Aristotle as philosophical thinker is derived from Plato,—that is admitted by every competent historian: but the true Plato fades away under his hands; the same has taken place in Kant's case through Fichte, Schelling, Hegel, and—do not let your admiration blind you to the fact—through Schopenhauer; every one of them lays hold of the side view that suits him, and works it up to a new superficial portrait. It would be an easy matter, without more ado, to fit these superficial portraits into our scheme; but the man who recognises what is unique in these two men, Plato and Kant, who can absolutely only be compared with one another, will not be in too great a hurry to go to work. Kant, for instance, is at the same time mechanist and dynamist, atomist and organisist,^{7a}—not materially as in the case of the investigators of nature who directly place contradictory notions side by side (p. 393 *seq.*), but because all these conceptions in the presence of the highest order of critical deliberation lose their absolute significance. It needs, therefore, a more exact critical reflection to distinguish the physical capacity, so to speak, from the plastically many-sided conviction which is arrived at by the most deliberate freedom of judgment.

In the interest of clearness I will say at once that Plato, as well as Kant, naturally belongs to the Goethe-Schopenhauer group, Thinking inwards, Seeing outwards,—yet it is only by degrees in the course of the exegeses which are to follow that you will understand exactly what is the meaning of this and of the premised remarks. With Plato we shall occupy ourselves in the next lecture; to-day we will hold fast to Bruno in order to arrive at an explanation, however cursory, of a difficult because fully plastic subject.

Unfortunately at the outset prejudice again hinders

our work of comparison: for we are wont to form a false conception of Bruno as well as of Kant. Bruno is, indeed, not the herald of a new science, the martyr of enlightenment, as he is usually represented, but rather is he through and through a schoolman: while Kant, far from being the abstruse philosophical professor dragging himself painfully over dialectic pin-heads to an incomprehensibly abstract "Thing in itself," is rather a man who is all perception, all observation, all investigator of nature, with the proviso that his Seeing is pre-eminently directed upon the Ego, his observation upon the dissection of the soul's life, his investigation upon the inner being of man. Bruno's philosophy indeed is quite abstract; it knows nothing of the observation of nature, inner or outer, its arguments are exclusively dialectical: Kant's aim, on the contrary, is from the outset—to borrow a phrase often used by him—the setting free from "sophistry and super-sophistry." Bruno is the typical bookworm and schoolman, who has at his finger-ends all the authorities for and against every argument, and whose memory in quotation is so fabulous that his contemporaries looked upon it as magic, whereas Kant, on the contrary, seldom, and only in passing, names any philosopher. Of the dialecticians of Bruno's nature, Kant says, "the athletics of the learned are an art, which may in some ways be very useful, but which adds little to the advantage of truth";⁷⁸ and when some one applied the word "dialectics" to his *Critique of Pure Reason*, he answered indignantly, "and yet my critical endeavours are all directed to setting free and destroying for ever the inevitable dialectics with which pure reason, everywhere else carried out dogmatically, is caught and entangled in its own net."⁷⁴

You see what contrasts face one another here. But there might be much more to be said yet. For the Bruno that you find everywhere, the Bruno whom our journalists

of antichristian tendencies believe to be inspiring them,—the Bruno whom the apostles of progress hail as the “morning star of the religion of science,”—the Bruno to whom a statue has been erected in Rome, and whom the Papists full of hatred would fain have called to life again for the sheer pleasure of burning him once more, and more thoroughly—that universally known, conventional Bruno has not much more than the name in common with the real man. And the other Bruno likewise, whom Eugen Dühring and his disciple Heinrich von Stein have given us, the man of phantasy and the poet, is rather the creature of their own phantasy and poetry than of an objective appreciation of the forerunner of Spinoza and Schelling. It is impossible for me to go more deeply into this; but if you wish to know Bruno’s methods in philosophy, open his Latin writings where you will; or if that should seem too hard a task, see in his Italian writings, which are relatively less scholastic, the analysis of truth at the beginning of the second dialogue of the *Spaccio della bestia trionfante*.⁷⁵ After this test you will easily understand that for this man Logic must be the science of all sciences, in brief, the *modus sciendi*, and that there were only three educational subjects which floated before him as the ideals of culture—Grammar, for the *concupere*, Rhetoric, for the *enuntiare*, and Dialectics, for the *argumentari*.⁷⁶ But time presses, and of much that I would fain have said upon this subject I will briefly mention only one thing, because it belongs indirectly to our Theme. You must not imagine that Bruno’s enthusiasm for the Copernican cosmology was the result of industrious astronomical observations, or in any way of a penetrating insight into truth, such as we admire in Leonardo who lived a hundred years before Bruno; the boundlessness of space belonged rather to the logical postulates of reason, which Bruno defended against Aristotle with arguments like the following: Since the

Human phantasy cannot conceive an end, nature must be boundless, otherwise it could not comprehend this phantasy!"⁷⁷ and for that reason Copernicus is so passionately welcomed by Bruno, he is so true, so victorious because this postulate of reason, taken from the neo-Platonists, at once obtains a practical footing. For Galilei the achievement of Copernicus means the liberation of the intellect for the building up of a new system of mechanics and cosmology; for Bruno it means the materialising of an abstract thought, and at the same time the victory of the principle of the setting free of all form which he championed against the principle defended by Aristotle of form as organising everything.

And now, as a complement to what has gone before, let me add to these few words about Bruno an equally hurried notice of Kant's relation to the wisdom of the schools.

Kant's comparatively scant attention to the writings of the philosophers has already struck more than one enquirer. In the whole *Critique of Pure Reason* hardly twenty names are mentioned, and these for the most part cursorily. Only Plato, Hume, and Leibniz are once or twice noticed rather more at length: in the *Critique of the Power of Judgment* not ten Philosophers are alluded to,—and most of them only once in a single sentence.⁷⁸ It is, moreover, specially significant that Kant only refers to the most important thinkers of mankind,—the others he passes over. "The learned multitude knows nothing, understands nothing, but it talks of everything and prides itself on what it says"—that is Kant's opinion.⁷⁹ Bruno, on the contrary, assures us that he loves the works of Thomas Aquinas "like his own soul,"⁸⁰ he knows by heart every schoolman of ancient and modern times, and does not disdain to quote as authorities the muddiest apocryphal sources of mystical bogus philosophy and theological sophistry—an Apollonius, a

Hermes Trismegistus, and gives up half his life to the Spanish mountebank and conjurer Ramon Lull who professed to arrive at knowledge by the help of revolving discs, and extols him as *omniscium propemodumque divinum*, omniscient and almost divine. Kant, however, tells us that he looks upon the voluminous elucubrations of the professional philosophers "with repugnance, with a certain hatred" (*Letters*, 8, 4, 66); and his amanuensis for many years, Jachmann, reports that "Kant found everything in himself, and so lost the capacity for finding anything in others. At the very moment of the fullest ripeness and power of his intellect, when he was working up critical philosophy, nothing was more difficult to him than to think himself into the system of another. Even the writings of his adversaries he could only grasp with the utmost pains, because it was impossible to him even for a while to distract himself from his original system of thought."⁸¹ Jachmann's commentary is a little shaky, but his ingenuous, honest testimony is all the more valuable. Kant was simply never at any time of his life able to take an interest in the peculiar philosophy of the schools. He who in his most advanced old age read every book of travels, he who followed all that concerned natural science with the most enthusiastic attention,—could only read the writings of his learned brother professors "with the utmost pains," and since, when every now and again he did take these "utmost pains," he still had not the power to find anything in these works, he preferred to leave them unread. There is no need to make any excuses for him. If there were a Kant to-day he would do the same. But we learn here how little justification there is for reckoning Kant straight away among the scholastic philosophers: it sets aside the whole picture of his intellectual personality. It is only the man who looks upon Kant from the right point of view, who can understand why to the end of his life he felt compelled to take the field against the professional

philosophers who were already beginning to introduce their own vagaries into his critical philosophy,—against “the metaphysics of the schools which tear reason to tatters,” and against the university professors whose chief business it is “industriously to convert the simplest thing in the world into the most difficult”: in opposition to all these fruitless subtleties, Kant maintains that his philosophy “can be understood from the standpoint of the common understanding,” and only exacts that this common understanding shall “cultivate itself adequately” to the business of Criticism. Kant looks upon the metaphysical analysis of our thought as a fundamental cultural exercise of the most universal importance, “indispensable to all future times for the highest aims of mankind,” which means in contradistinction to its being regarded as mere abstruse, learned, professional discipline.⁸² Hence his assertion that “the practical philosopher is the true philosopher” (Logic, III)—hence the touching appeal in the middle of the *Critique of Pure Reason* to “those who have philosophy at heart, which is oftener said than met with” (p. 376).

What I have specified here upon the subject of Kant's relation to the schoolmen is at the same time a symptom of a more deeply ingrained peculiarity of his personality, namely of the stress which it laid upon the necessity of perception. Until a man has recognised this he knows nothing of Kant. On one occasion he talks of a drop of water and of its swarming life of minute creatures, and then goes on: “if from that I lift my eyes to heaven in order to see the immeasurable space teeming with worlds like grains of dust, no human speech can express the feeling which such a thought arouses, and all subtle metaphysical dissection is far removed from the sublimity and dignity which belongs to such a perception.”⁸³ This sublimity and dignity of the perception is the scarlet clue which, threaded through his whole life-work, was the only thing

which enabled him,—the only thing which enables us also—to find a safe path through the stifling world of thought. In the same way in the realm of practical philosophy, which, as I said just now, Kant had chiefly at heart, and in which his theoretical abstraction was often cast in his teeth,—with reckless vehemence by Schopenhauer for instance,—he teaches us that “ Goodness has an irresistible power, when it is perceived.”¹⁴ Where Kant is very hard to understand is not really, as is the case with other philosophers, because the abstraction becomes too subtle for it to be possible to fasten any notion upon it, but, on the contrary, because though he sees with the utmost perspicacity (with that perspicacity to which I alluded in the first lecture) the relations of the human intellect, no means exist of communicating this perception except by a whole ponderous structure of abstraction piled upon abstraction. Hence the many repetitions which are characteristic of Kant’s writings and often lead a beginner astray ; for he thinks to himself, Here is something new, whereas Kant is for ever labouring to communicate the same perceptible knowledge by means of new thoughts and new words until we become familiar with it and see it, instead of merely thinking it. So far as I am aware, no teacher of philosophy has called attention to this fundamental fact which is so conclusive for the apprehension of Kant’s style. Every man who has had the advantage of a certain technical training can understand purely logical combinations of thought, and can, if he so desires, himself explain them ; but the previous lecture will have shown you how monstrously difficult it is to communicate a conviction arrived at by the loftiest power of conception,—that the elementary conceptions of understanding, the primitive forms of all judgment, can only be distinguished from the side of perception, but are incapable of being defined by words—and for the very reason that they are

hemselves the primitive conceptions (p. 295). Equally difficult is the communication of Kant's conception of freedom. Here the direct inner experience of every individual must be revealed in connection with the inexorable all-uniting sum-total of Nature; but the language of logic fails, for such an insight oversteps the boundaries of its competence. So it is with the "Thing in itself," with the ideality of time and space, with the representation of God as "the regulating principle of reason," and so forth. This is no mystical enlightenment, no "intellectual perception," as Hegel calls it, no "supersensual perception," as Schilling says. Kant loathes all such conceptions. "I ask for your opinion, but as far as possible in human language. For I, poor son of earth, am in no way organised for the divine language of perceptive reason. That which may be spelt out for me according to the rules of logic out of common conceptions, that is well within my reach." So wrote Kant to Hamann (6. 4. 1774). Far rather, as I have said, does the difficulty lie in the fact that our words in the first place refer to conceptions, and that conceptions can only indirectly awaken perceptions. A whole book upon the colour white and its properties does not tell me what white is: in order to experience it I must open my eyes and look upon white: that is the example which Descartes uses: it is the same with the facts which Kant saw in the inner man; until we have seen them ourselves it is not only difficult but impossible to understand Kant. So it follows that whoever has only grasped the word, not the perception, in Kant,—only the logical structure without the facts which led to it,—has gained little or nothing.⁸⁵ You, gentlemen, will in future know exactly what it means when of those who wish to work at philosophy, as a foundation, Kant requires not in the first place logical and dialectical studies nor historical knowledge, but "exercises in the judgment of experience," and "attention to the compared sensa-

tions of the senses," in other words, a schooling in Seeing inwards and outwards.⁶⁶ And you will understand why Kant warns us against the "teaching of the philosophers" and against "definitions which are so often misleading," whereas "the true method of metaphysics is in principle one and the same with that which Newton introduced into natural science," that is to say, the method of "sure experiences," which here certainly means "inner experience," yet none the less experience "directly visible to the eyes."⁶⁷ I also think that you will now begin to understand why we may, and indeed must, say of this man that his Seeing, like that of Aristotle, Descartes, and Goethe, was directed outwards and not inwards; while his Thinking was directed entirely inwards, and so overwhelmingly, so intricately complicated, that his physical eyes had little power left to look out upon the world. Even in the darkest depths of the inner man what he saw was everywhere organisation. You will also understand what is meant when Kant in a posthumous fragment asserts, "I am myself by inclination an investigator,"⁶⁸ and when he writes to the anatomist Sömmerring, and says, that just as Sömmerring busies himself with the dissection of what is visible in man, so he, Kant, busies himself with the dissection of what is invisible in man. It is certainly important for the knowledge of Kant's personality to remember that of Kant's sixty-five works, almost one-half, namely twenty-nine, have no philosophical purport, and that in the period of his progressive development up to his fortieth year, he only published six works dealing with metaphysical subjects, as against thirteen upon physics, mathematics, geognosis, meteorology, astronomy and anthropology. Here you have the diametrical opposite to Bruno, in whom the most glorious of all objects of perception, the boundless heaven of stars, only serves for a logically dialectical system of thoughts, whereas in

Kant it is the thoughts themselves that rest upon perception, and for that very reason struggle painfully for conceptive expression.⁸⁹

With this is connected Kant's strict delimitation of the significance of his logic. Bruno, as you have already heard, held it to be the science of all sciences, the true fountain-head of recognition. His ideal of absolute recognition is that which reason, purified of all contact with the world of sense (*intellectus purus*), perceives by mere introspection, that is looking into itself, *omnia in se ipso videndo*, whereas it sees nothing outside of itself (*non extra se specularando*).⁹⁰ And if he ascribes such a fully pure recognition to God alone, that has no great significance, since in principle Bruno recognises only one all-embracing monad into which every intelligence crosses over by stages, and so is essentially related to it.⁹¹ Thus it comes to pass that in the end the definition of truth is "the law of intelligence reflected in things," *veritas est ipsa lex intelligentiæ observata in rebus*.⁹² The same principle emboldened Hegel to utter the monstrous definition, "Logic is the science of God." As against this Kant has shown once for all that logic is only a formal science, touching those combinations of conceptions which, in the previous lecture, have been shown as a necessary function of the human intellect. "But," as he says, "since the mere form of recognition, however much it may agree with logical laws, is still far from adequate on that account to determine the material (objective) truth of recognition, it follows that no one can dare to form judgments upon subjects with the help of logic alone, or to assert anything without having previously made fundamental enquiries outside of logic, in order afterwards to attempt their utilisation and combination in a consistent whole according to the laws of logic." To take a practical perceptible image. With the help of crucibles, hammers and files

man can at will manufacture for himself golden ornaments ; but the gold itself is produced outside in nature, and is brought to the light of day with axe and spade. And so Kant goes on to write, " now we may take it as a sure and useful warning : that universal logic looked upon as organon is always a logic of appearances (dialectic). For since it teaches us nothing about the contents of recognition, but only the formal conditions of agreement with the understanding, which moreover are quite immaterial in view of the objects ; so the demand to use them as our tools in order to widen and extend our knowledge, at any rate so far as profession is concerned, can end in nothing but idle chatter in order to assert or to attack whatever we please with a certain show."

You see how clearly and sharply Kant distinguishes himself from all the schoolmen, from all the rationalists in the true sense of the word, from Socrates, Bruno, Hegel, how differently from these men he sees and judges the importance and limitations of human reason. Never again will you be led on account of a certain apparent similarity of language to associate him with those philosophers from whom he really differs entirely in his whole manner of Seeing, his principles, his methods and his aim.

I have said thus much as a preliminary orientation of Kant's position as contrasted with that of Bruno, in order to arrive at a more correct view of it than that which commonly obtains. We will now take a cursory view of Bruno's philosophy in its principal outlines in order to reach a further stage in our knowledge of Kant's personality.

We must not believe that Bruno was a specially inventive genius. Almost all his doctrines were taken directly from the German Nikolaus Krebs of Kues on the Moselle, better known under the romanised name of Cardinal Cusa, amongst them those of the boundlessness

of space and the numberless inhabited worlds, as well as the other doctrine of the finality of divisibility—the atoms, and that of the philosophical significance of numbers, of the stage ladder of things and beings, of the identity of contradictions, of complication (for thought) and explication (for matter)* and so forth. Even that perception which is the most original of all his notions, the doctrine of monads, is an old possession of the neo-Platonists, and the very saying that God is “the monad of monads” (*monadum monas*) occurs in Synesius of Cyrene a thousand years before Bruno.⁹³ ↘

At bottom the philosophy of Bruno is simple, grievously simple; there is one single thought which ever and again arises on all sides, that of the pantheism. We might, indeed—at least if we desired to borrow logical consistency from the Panlogicians—make no distinction between Nature and the Ego, and between both those and God. I have already quoted the saying that “Nature is God in Things”; in the same way the Ego is fused with God and with Nature; as God is the Nature of Nature, so he is also the Ego of the Ego, “the Soul of Souls, the Life of Lives; more intimate, nearer, more closely related to us than we can be to ourselves”; and is it not the last conclusion of wisdom that there is “only one Being, one single and identical Thing”?⁹⁴ What we could distinguish as God, world, and Ego, is only a species of motion or pulsation inside the one universal spirit; from God down to Nature and to the Ego, ascending again from the Ego to God through Nature. *Influit Deus per naturam in rationem; ratio attollitur per naturam in Deum.*⁹⁵ In strictness we ought to say that there is only one unity without distinction; we might call the Divinity absolute unity without any sort of formation, *unitá*

* Terms for which Cardinal Cusa is responsible. The idea is that thought arises from folding down and inwardly—matter arises more and more from unfolding.

assoluta senza specie alcuna ; but we may leave out the conception "God," and say Nature is the All, and is its own creator—*natura ipsa est fabricator* (De. imm. viii. 10, 11); or again we need speak of neither God nor of Nature, but only accept the immovable boundlessness of the universe—*infinito immobile*—in which there are no distinctions, where the mathematical point is the same as the whole body, the centre the same as the circle, the limited the same as the unlimited, the great as the small, the whole as the part, light as darkness, hatred as love, the formless as that which has form ; here then there exists no difference between a man and an ant, between an ant and the sun ; the soul of a flower, of an oyster, of a fly, of a man, are of a similar entity in species and genus.⁹⁶ In this God-Cosmos-Ego, the boundary is at the same time no boundary, form no form, matter no matter, soul no soul, and even error is "latent truth" ; for everything is at once everything, without distinction, since everything is only one single unity ;⁹⁷ here one name is sufficient to comprise everything ; here there is only one reason which thinks, only one will which desires.⁹⁸ Contradictions viewed from this standpoint there are none, they are rather fused together like twins : *quæ in se ipsis diversa sunt atque contraria in ipso simplicissimo principio sunt unum et idem* ;⁹⁹ indeed, all things are made up of apparent contradictions, *tutte le cose constano de contrarii* ;¹⁰⁰ but for the man who is gifted with recognition distinctions are wiped out, they coalesce in the *coincidentia oppositorum*. If the One Undifferentiated unfolds itself as it were, then there arises the All with its unnumbered creations ; if the All folds itself together, then the Undifferentiated One arises once more.¹⁰¹ Thus the birth of a thing is the expansion of a centre which is imperceptible and only to be grasped by our thoughts ; its existence is the lasting duration of the sphere so born ; its death is its shrinking together to the original centre.¹⁰²

One remark in passing. This doctrine of the Universal Unity is as old as the Indo-European race, and therefore really worthy of respect. But it is only to be found in perfect purity, and therefore also really intelligible and sympathetic, among the Brahmans,—less satisfying and yet always beautiful, sometimes even enchanting,—among our European mystics. In order to be capable of acceptance it needs must stand upon a religious foundation: the religious myth then surrounds it with images, and the moral aim of a practical union of man with God lends it an august dignity. Where, on the contrary,—as to a certain extent in Plotinus, and more outspokenly in Bruno,—it presents itself not supralogically, but rationalistically, not as a suggestion but as argument,—where it aims not at the intensive raising of the individual, but at the irrefutable dialectical proof of empirical truths,—there the doctrine of the universal unity becomes frankly intolerable. For the sake of a miserable logical trick it annihilates form, personality, analytical science. That such things should again be stirring among us, befooling weak brains, is very lamentable. In religion mysticism is indispensable, for it is through mysticism that the myth first becomes living experience: in philosophy it is poison.

Without going any further into principles, I may here call attention to the fact that the weakest point in Bruno's philosophy is the scanty stress which he lays upon the Ego. For it is only from the point of view of absolute subjectivity that the doctrine of Universal Unity possesses any real justification. The Brahmans taught that "there is no possible proof of the existence of a dualism, and the *Atman* (the self) devoid of all dualism is alone capable of proof,"¹⁰³ and even the man who takes his stand upon the flattest empirical science is not in a position compulsively to prove the contrary. But upon this there follows at once, "Here, in the depths of the

heart, lies the Lord of the universe," and "our soul is this world."¹⁰⁴ God and the world united in the Ego and overflowing the one into the other: that is a consistent standpoint, and inasmuch as it rests upon secure facts, even though they should be grasped one-sidedly, it is rich in results. Whereas when definition and argument put God and nature on a level, only dragging in the Ego in an inferior character as "reason" or "thinking substance," as of a wavering essence which everywhere stands in the way, and of which therefore the less said the better, the perception is obviously one whose roots do not go very deep; for whence do all these arguments come if not from the Ego? Bruno stands precisely where the priests stand: but the latter have dogma for their foundation and practical reliability as their aim, whereas the man who goes to work in the same way in a subjectively-rationalistic manner, but who replaces the dogma of faith by the dogma of reason, and takes for his aim the recognition of absolute truth, is hovering in mid-air. In the one case, that of the true mystics, we have an experience that has been lived, in the other case, that of the dialecticians, a cobweb of the brain. The *Deus sive natura*, brought forward by Bruno and geometrically described by Spinoza, is a phantom of the conception, an artifice of the schoolmen welded together out of superstition and the "logic of pretence," as Kant calls it. God is not to be seen in nature, nor can He be demonstrated from her; only the man who carries Him in his heart will also be able to track Him in the outer World. Our deep-thinking German mystics knew this and said, "Whoso wishes to perceive God must be blind."¹⁰⁵ But in truth Bruno's God is seen neither in nature nor in the heart; this monad of monads from which "proceeds that other monad which is called Nature," is a mere abstract thought.¹⁰⁶ All attempts to sing his praises as *Eus*, *Unum*, *Verum*, *Fatum*, *Ratio*, *Ordo*, and as the foundation

of all things which we in the first place hold to be the creations of nature, are of little consequence.¹⁰⁷ The God of the true mystics, on the other hand, springs out of direct experience, and the God of Descartes who Saw outwards was just as much a dialectical artifice as Bruno's, but obtained by deliberation and with the intention to enlist this conception in the service of empirical investigation, so that here, if ever, we have the right to say "the end justifies the means."¹⁰⁸

Here I must set a limit to these short remarks. I am no more able to do justice to Bruno's complex of thoughts than I was to develop the philosophy of Descartes; I must be content if you are able to grasp clearly and correctly the method and way in which this man looked inwards and outwards upon the world and upon himself.

But our aim for the moment requires that I should once more call your attention to the two main pillars of Brunonian thought which together with the universal unity of the divine nature carry the whole structure: a tendency to boundlessness upwards, a tendency to strict limitation downwards (pp. 364-378); these at last complete the picture and bring clearly into view the contrasted method of perception in Kant. There is no need to repeat what has already been said upon the point, I refer you to it and will only ask you to observe how here again, as in the representation of God and the world, it is scholastic and theological conceptions, not perceptions, that are decisive. God must of necessity be infinite, because the conception of Him excludes every limitation: *Io dico Dio tutto infinito perche da se esclude ogni termine*. But since God is infinite so too must the world be infinite, for it would be unworthy of a Divine power to create a finite world: *Io stimavo cosa indegna della divina bontá e possentia che possendo produr oltra questo mondo un altri e altri infiniti, producesse un mondo finito* (Berti, p. 353). These are purely theological

arguments, which are only forcible when the God whose existence they prove has already been assumed. Those arguments, on the contrary, by means of which limitation downwards, that is to say, the conception of the Atom, is irrefutably set forth, are scholastically dialectical. Above all it is the Pythagorean symbolism of numbers which turns the scale: "Unity is the substance of numbers," that is to say, that out of which numbers arise and of which they consist, and therefore "unity is at the same time the essence of all things": *Unitas est substantia numeri et essentia omnis*. But unit signifies the lowest of all numbers, and what we in calculating call unit that, as Bruno argues, we may call in matter a least measure or minimum, so that just as we may call the arithmetical unit *numeri substantia* so we may regard the material unit, the Atom, as *rerum substantia*, as the essence of things.¹⁰⁹ In the *Spaccio* Bruno uses a charmingly popular expression: *le cose grandi son composte de le picciole e le picciole de le picciolissime e queste de gl' individui e minimi*. If divisibility were not to come to an end there would be just as much illimitedness downwards as upwards: *si minimum non subsistit nihil subsistat oportet*. Without limited, indivisible, minimum-unities there could be no world. Here the argument is purely dialectical, and therefore it is far more powerful than the first, and Bruno himself confesses that it would be easier for him to give up the infiniteness of the world than the finiteness of the atoms: *potius ratio et natura potest absolvere minimum a maximo quam maximum a minimo*.¹¹⁰

So the dogmatic Infinite and the dogmatic Finite join hands, and once more it is the Ego, the first great fact of all recognition, which comes off second best, or rather remains altogether ignored, penned in between animated atoms, called monads, and a soul of the world, *l'intelletto universale, l'anima del mondo*. And in order to rivet into

a unit this perception which consists of two antagonistic parts, there happens once more what occurred in the case of God and nature: Bruno declares right out: the maximum and the minimum are identical, *il massimo e il minimo convengono in uno essere* and *maximum nihil est aliud quam minimum*. The following attempt at a logical deduction from the proposition that the minimum and the unlimited maximum are equal to one another is worth bringing forward as a specimen of the method of thought of such men, "The power of all bodies is perfected in the sphere, the power of the sphere is rooted in the circle, the power of the circle in its centre. It follows that the power of all visible things rests in the invisible. A minimum in multitude is a maximum in power, just as the power of the whole fire springs out of the power of the single spark. So it follows that all power rests in the minimum even though it should be hidden to the eyes of all, even of the sages, perhaps even of the gods: thus the minimum itself is the maximum of all things."¹¹¹

Clearly Kant was right when he said that Logic used as an organon, that is as an instrument for acquiring new knowledge, has for its object the power of asserting anything in the world with a certain amount of plausibility. But it is equally evident how powerful those inborn tendencies of the particular individual, of which we treated in the excursus, are in leading it naturally and of necessity into fixed grooves. We have no freedom in the choice of the myths which appeal to us. Thinking inwards leads to Monism, to the Universal Unit, and at the same time to the uprooting of all boundaries, that is to say, to the Infinite; Seeing inwards leads, whether we will or not, to Atomism, to the acceptance of indivisible minima. The man who, like Bruno, binds the two things together by sheer force, and is not frightened to say *minimum est maximum*, the limited is unlimited, gives proof there of a great power of inner truthfulness:

such an intellect was worthy of being brought to the stake. At the same time you will, I think, henceforth understand Kant's saying, "the doctrine of atoms is in itself a contradiction."¹¹³

We have now gathered together all that we need in order rapidly, easily, and surely to understand Kant's method of perception as compared with that of Bruno.

That which characterises Kant's manner of looking into the inner mysteries of man may be summed up in a single word—criticism. Still, it is necessary to know exactly what is to be understood here by criticism; for the word is used in two different senses: "I do not mean by this a criticism of books and systems, but that of the power of reason in general,"—so writes Kant in the beginning of the preface to the first edition of his *Critique of Pure Reason*. The difference is the same as that between the criticism of a historical work, and the so-called "historical criticism" of the matter on which the book is founded; in the one case it is the exposition of a given author, his opinions, his conceptions, his deductions which are judged and censored, in the other it is the proofs themselves upon which all the expositions, however they may differ from one another, depend,—inscriptions, books, letters, state documents, etc., which are tested for their origin, their importance, their reliability, and their value. It is in the latter sense that Kant understands the word Criticism. It is a test, not of the opinions about reason, or in any way of the doctrines to which reason has given rise, it is not a test of the opinions on experience, on the power of judgment, on morals, etc.,—but it is a test of the inmost soul of man by direct dissection and observation, exactly as the surgeon with scalpel investigates the condition of the inner body. In an often-quoted passage, Kant writes, "The first step in matters of pure reason, which shows how it is still in its childhood, is dogmatic. The second . . .

step is sceptical and testifies to the prudence of the power of judgment sharpened by experience. But there is yet a third step necessary which only occurs in the ripened and manly power of judgment, namely the appreciation not of the *facta* of reason, but of reason itself according to its full power, which is not censure but criticism of reason."

I am very anxious that you should arrive at an absolutely precise understanding of this critical faculty and method, for Kant is besides Plato the only critical philosopher of all times : how then could you do justice to his individual personality unless this most special feature were clearly before your eyes ? With this intent I must now make use of an image which will gradually lead you to a systematic recognition. In this connection I am haunted by an unforgettable recollection of my youth, which dates from the time when I first heard Kant's name : it will help us to produce a plastic representation.

Let us suppose a man born in the deeply cut valleys of the Maritime Alps, and that an ordinance of fate should have so locked him and his countrymen to the neighbourhood, that no inhabitant should have succeeded in making his way out to the shores of the Mediterranean. You must know that the mountains are so extended in échelon that one needs to climb very high—up to the perpetual snow of the highest peaks, before one can see the sea. That man asks himself, as so many before him and around him have done, whence comes the water which the clouds give off upon the mountains in such inexhaustible measure that even during the long, dry, hot summer the brook incessantly rushes down to the valley bringing coolness from snow and ice ? Among the dwellers in the valley all sorts of theories are current. The pastor teaches that God in his mercy is for ever creating new rain clouds,—especially if his flock are diligent in their attendance at church. The apothecary has made up a highly complicated scientific theory of a

catalytic combination of oxygen and hydrogen in the low pressure of the highest regions of the air under the influence of the sun's rays. The schoolmaster is busy hunting up explanations in the classical authors, but as he has never seen the sea, he understands the ocean in the old sense of the *okeanos potamos*, a river with side streams, and so gets entangled in a feud about suffixes with the pedagogue of the neighbouring village, in which feud both lose sight of the original problem. The village philosopher's doctrine is that every investigation of the question remains barbarously empirical and objectless, so long as it is not determined whether water is to be regarded as substance,—*hypokeimenon*—or as attribute—*symbebekos*, which, however, assumes the solution of the first question whether substance is really an *ens per se subsistens*, or a mere *fatus imaginationis*. Meanwhile our friend actively climbs uphill, is undaunted by failures and fatigue, and at last, thanks to his practice in mountaineering, reaches close to the highest peak. Not more than two or three had got so far before him; but these few, keenly absorbed in their search after causes which seemed plausible to them, had clung to the rocks and tried to shovel away the snow in order to see what lay underneath. They thought that if they found a spring breaking out of the rocks everything would be explained. They were mere empirics. But he thinks otherwise, and when he has climbed as high as his strength will carry him he turns round. He turns his back to the brook and the glacier and looks over the successions of écheloned mountains, and there, further than he had ever allowed his thoughts to range, there in all its glory, there in the golden reflection of the midday sun, lies the immeasurable sea. He sees the rivers hurrying to it from all sides, and he sees the mist rising from its waves, consolidated into clouds, and flying with the evening breeze to the mountains.

That is something like the position of Kant amongst us

thinking men. And even if every one of my images should be failures, this one is quite in tune, and I should like to impress it permanently upon you in this way : in Kant the one essential point is a turning round as it were on the pivot of the intellect, so that the mind looks in a new and opposite direction, and so obtains a sight of that which was up to that time unsuspected. The man who climbs just as high and does not turn round will never have a share in the revelation of a fully new fact : but the man who turns round before he has reached a certain height which will make him competent to enter upon intellectual deliberation, will find himself disappointed: for he will see no more on the height than he did in the valley. Mark this too! no dialectical art, were it never so subtle, and no power of phantasy, could have discovered the sea, whereas without logic and without phantasy it is seen at once if the man only understands the right standpoint from which it of itself strikes the eye. Kant is a discoverer, just as Columbus was, or like his own favourite Captain Cook. And it is absurd to believe that what this unheard-of and unique critical power of perception discovered and revealed, could be discredited by any given man, simply because he is not competent, and has not made himself competent, to see it. Our friend who saw the sea with his eyes will hardly be convinced by the professor in the valley that it does not exist ; it is in this sense that you must understand Kant when he says of his critical results, " In this case there is no danger of being refuted, the danger is of not being understood " (R.V. xliii).

The picture which I have set before you not only gives an expression easily understood to the fact itself, but also to the result of the Kantian method of Criticism. For there is no more important result of these discoveries than that of the strict and relatively narrow limitation of the competency of our reason,—that limitation which

was cursorily indicated in a former lecture as a double wall. Once our mountaineer sees the ocean, he has before him the whole circulation of the water, and the whole horizon of his knowledge of this subject is effectively widened and yet once for all ideally confined within limits. So long as he was unaware of this circulation, this giving and taking, this motion hither and thither between close boundaries, there were no limits set to his philosophical and mythological phantasy, the tendency of which was necessarily to lose itself backwards as well as forwards in the infinite; whence should that inexhaustible supply of water come? whither should it go? Now at one stroke the whole problem is solved, or rather shown to be non-existent. The water was returning whence it came, and came from whither it went; it did not spring from the hidden bowels of the earth, nor did it flow into boundless space. At the same time, however, there was an end of all hope of an absolute "explanation" such as had flitted before the minds of the simple folk. Of course it was always possible to ask with the old philosophers, whether water was attribute or substance, and whether the substance was an *ens per se subsistens*, or a *fatus imaginationis*; but this dialectical consideration had ceased to bear any relation to the water problem, and was unmasked as a matter of pure metaphysical speculation. It was now possible to be concerned with the investigation of the details and the utilisation of the circulation which had been discovered: the ideas of the pastor and the apothecary and the schoolmaster and the others, whoever they might be, were all swept away: they were henceforth not only idle but demonstrably false.

One more picture by way of amplification.

Four centuries ago there were no boundaries to our planet earth. Each man was free to imagine it according to his own pleasure. Above it in Heaven was the place

of the blest, below it in Hell was the place for the damned, —room for all. Then came Columbus and his followers, and it turned out that the earth was a sphere measured through in all directions, upon which if a man sailed on westward he came back to his starting-point from the east, a prison from which there was no escape. Magellan's men had even feared that they were reaching the rim of the world and would topple over ; now every one knew that we, at any rate so long as this life lasts, are chained to our dust-speck of a planet, and that every fall means falling back upon the earth. And then came Copernicus, and robbed us of all space for our dreams ; for God who is in Heaven there was no place left, no place for the eternal fires of Hell—indeed, as soon as space became recognised as boundless there was no Above and no Below, no Here and no There. The service rendered to human thought by Kant's *Critique of Pure Reason* is throughout analogous. It sets free and at the same time imposes limits. "The age is no longer to be held back by sham knowledge." So Kant sets out upon his voyage of discovery ; his aim is to achieve true knowledge instead of sham : the result is, however, that our reason, like our earth, is represented as a sphere moving freely, limited all round, and by itself. Here too there is no "rim" from which a man can reach a space beyond, either upwards or downwards ; rather does every road over which our thoughts travel only lead in a circle on this small Sphere of Reason : it is only upon the ocean of experience that we can circumnavigate it, and if we boldly press further and further ahead, we once more come back to the place whence we started. Earth-born we are, and to earth confined. That is why our reason as Kant says, "can never go beyond the field of possible experience," and can never undertake to escape from this domain which has been assigned to it, because beyond it there is "nothing for us but empty space."¹¹³

Thus hand in hand with the Copernican expansion goes the Copernican limitation. Since we are confined to experience, all those doctrines which attempt to fly over it fall at once and for all time. So, for instance, Kant annihilates all so-called "proofs" of the existence of God down to their deepest roots; God is a practical postulate, something which we believe, not something which we can know or in any way imagine. And on the other hand, in opposition to the many dogmas of natural science, which, as I showed in my first and second lectures, outstep experience in every end and corner, Kant shows that every doctrine of bodies ends with emptiness, and therefore with that which is unintelligible, and that there is therefore nothing left for reason in this domain, "but instead of investigating the utmost bounds of things, to investigate and fix the utmost bounds of its own unaided power, left to itself with no help from outside." As for what concerns the sophists after the manner of Bruno, and to be just, of all the school-philosophers from Aristotle to Hegel,—how they take the field against one another with their armies of definitions and syllogisms, and prove with keenest precision either that God is identical with nature or else is essentially different from nature, that there are atoms or that there are no atoms, that the world must be infinite or of necessity finite, and so forth, Kant pronounces judgment from the standpoint of criticism; "There is thus in reality no room for polemics in the field of pure reason. Both sides are flogging the air, puffing themselves out with their own shadows: for they go beyond nature, in which there is nothing for them to lay hold of: they may fight as they will: the shadows which they cut down grow together again in a moment like the heroes in Valhalla, in order to be able to make merry again in bloodless contests."¹¹⁴

I think you must see clearly what it is that differentiates the view which Kant's eye takes of the world from the

view of the typical schoolman and fanatic of reason, Bruno. The one fathers criticism, the other dogmatism. The fact that Kant soared higher with his thoughts than Bruno, would only constitute a relative difference; but the fact that he possessed that higher discretion of which I spoke at the beginning of this section, and which I tried in our parallel to illustrate as a turning round of a man's self, forms a fundamental difference. Here he becomes something more than a philosopher, he becomes a scientific discoverer; his view has brought to all the more gifted of mankind a revelation the result of which is a totally new comprehension of human life and of human ideals.

But we must take a further step before we make an end of this lecture. What I said a while ago about Bruno's conception of the Ego, Nature and God, together with the previous reflections upon mythology and Hellenic philosophy, and all this in relation to our former lectures, allows us now to obtain a deeper and more exact insight into the personality of Kant. You know how I am tied down: I cannot take Kant's philosophy as known, nor can I work with scholastic conceptions. That is why my characterisation of Kant's critical method has penetrated so little into detail, remaining little more than an illustration of an intellectual attitude; a closer inspection of Kant's method must be reserved for the last lecture. Still, I think that we have now sufficient material to take a bold plunge into the deepest water without any fear of being drowned in pure abstractions—we shall be buoyed up by many concrete notions.

Kant attaches great weight to the fact that he "not only suspects, but has proved" the impossibility of knowing anything outside of experience. Do you know how it became possible to add cogency to this proof? Through the criticism of experience itself, through the proof that our experience is composed of various recipro-

cally conditioning parts, so that neither that which we perceive as the "World" nor that which we think of as "Ego" is of itself simple, and thus perception blocks up thought, and thought blocks up perception, each preventing the other from seeing out into that which lies beyond our limited human experience. The dogmatist has no suspicion of this. If I leave the contemplation of the starry heavens with Anaxagoras in order to deduce that it is God who sets them in motion, then, through the intermediary of a mere inference of thought, I leave something perceived in nature to arrive at something which is impossible of perception. Precisely the same is the case with the God of Aristotle and his fifty-five heavenly spirits or aims: the painfully exact observation of empirical facts is fundamental, but the thinker strides out over these facts from one logical inference to another until its want of consistency and conclusion is satisfied. A Bruno, who must serve us as the type of the whole second army of thinkers from Yádjnavalkya to Schopenhauer, sets to work in a different way, for whilst Anaxagoras and Aristotle stride outwards on the path of perception, and take God as at most the mechanical author of all motion, Bruno, on the contrary, at once works inwards on the path of thought, and finds God as the very inmost conception in all things, setting them in motion from this "inmost" and not from outside. *Da noi si chiama artefice interno perche forma la materia e la figura da dentro*, "we call him the builder from inside because he forms matter and form from within outwards." *Motor ab internis* is God.¹¹⁵ In the same way the Indians called God the inner director. Here the world does not become intelligible until we see God at work; in the other case God was deduced from the conception of the world. You no doubt observe that in these two opposite methods of thought, with the direction outwards and the direction inwards, and the two divine myths which

result from them, God in the outermost, God in the inmost, there is one fundamental acceptance common to both. Both put in the foremost place that identity of thinking and being, or thinking and seeing, of which I spoke at the beginning of my lecture, and which I recognised as the fundamental myth of all philosophising: for if this identity did not exist these thinkers would have had no right upon the path of mere logical consideration to arrive at the conclusion of the invisible from the visible, from the perception of motions to the necessity of a moving power. And it is this common foundation of all different doctrines which Kant lays in ruins by his criticism of experience, and of which Plato, full of prescience, two thousand years earlier, but without being understood, had exposed the untenability. Kant's criticism proves that our Thinking and our Seeing are so interdependent and interwoven that neither dare take a single step without the other. "Understanding and sensibility can only determine subjects in us (mankind) when they are in combination." If we separate them, we have perceptions without conceptions, or conceptions without perceptions; but in either case notions that we can refer to no fixed subject. Between the canopy of heaven and the invisible God whom we believe to have created it and to cause it to move in circles, there lies only a chain of thoughts without any perceptible foundation; between the Atman-Pneuma-Soul in my living consciousness and God, both living *in* all things and inspiring them with souls, there lies a mere analogy of the material of perception, an aerial rainbow-bridge, leading from the known across to the unknown: both are equally inadmissible, reason dupes itself. For thinking outside the domain of experience marked out by perception (like God "over the canopy of heaven") is mere "toying with notions" (R.V. 195), and the pretended perception of something which cannot be perceived (as for instance of

the inner Deity) is a fiction surpassing all imagination,—a “mere freak.” The critic will not allow what both the monist and the dualist have the impertinence to do,—the splitting up of that complex whole upon which our experience depends,—the Ego-Nature or the Nature-Ego, call it what you will,—and so where the one part cannot co-operate permit the other to be pressed forward alone. Thoughts, even when they are born of the Ego, only depend upon perceptions in nature, perceptions which even when they are borrowed from nature have no existence unless they are intelligibly accessible to the Ego. In contradistinction therefore to the assumption of two absolutely separate, but therefore absolutely equally valuable component parts,—Thinking and Seeing, the Ego and the World,—the critic points out that both parts are organically interdependent, something in the same way as the nervous system and the heart : without the functions of the nerves there can be no action of the heart, without heart-action no function of the nerves—so that it is impossible to advance a single step with the one without the other. It is thus that the primeval myth of all mythology and of all pre-critical philosophy falls to the ground.

Do you observe how there lies before us here a second relation of reciprocal conditioning and being conditioned, directed more inwards? Without given, immutable, forms of Thinking and Seeing from which there is no escape, there can be no possible experience of empirical things ; on the other side, however, without empirical experience, and that means without any “matter for recognition by the senses,”—without something given outside of the perceiving Ego, no Seeing, and without empirical perception no Thinking and therefore again no experience. Each of the two parts is at the same time conditioned and conditioning ; and since that is so I as man can never attain to anything which is indepen-

dent or free from condition or absolute: there is no possibility of reaching a place of vantage in that direction. It is impossible for me ever to comprehend the Thing, purely as such, and stripped of all forms of human perception and thought; for that which I conceive as Thing is through and through amalgamated with an inseparable alloy out of my own inner self; so much so that if I try to brush away all that is subjective (the impressions of the senses and the categories of thoughts), I end by reaching not the notion of a Thing, but a mere abstract conception, the conception of substance, the shadow of a shadow thought, and even that I must abandon because it is after all only an indispensable formal conception, not a true perception. I fare no better when I try to grasp the Ego purely as such with its inborn laws of Seeing and Thinking; for it is so thoroughly real—the form of sensibility, all the possible series of thoughts, time as the intermediary between both,—this whole complicated intellectual organisation is so exclusively coined upon objects of concrete experience, that when I try to remove all that is corporeal, and to reflect upon my mere Ego-consciousness, I at last reach not a thought, but a bare, poverty-stricken because entirely empty, perception, without comprehension and without ideas.¹¹⁶ Here the result is a double insight. First, “if I remove the thinking subject, the whole corporeal world must collapse”; secondly, “if I remove the corporeal world perceived by the senses, the thinking Ego fades away.” Nothing can prevent me from distinguishing analytically my own Thinking and my own Seeing as two different functions of my power of recognition, just as I distinguish between heart and brain; but I am not in a position even in thought to isolate a pure Ego, freed from all empiricism, from a pure, entirely objective, corporeal world, for in that case there would remain mere phantoms, empty words without sense. And of course you already under-

stand that this single examination suffices to expose as "freaks," as Kant says, all the philosophies which nevertheless found their structures upon this separation, or, as we would rather say, as interesting but violent mythologies. For whether I try in common with the thinkers of the Bruno group to consume the corporeal world by the Ego-world, giving a soul to everything, denying all individuality, annihilating all form, till I can say with Plotinus, "Nature is Soul," and with Bruno, "it is a single divine Monad"; or whether like Democritus I win over the Ego-world to the corporeal world, and declare with Kapila "I am not"; or whether with Aristotle I undertake to separate the two entirely from one another—on the one side, the Nous-creator related to the Ego, on the other, the corporeal world related to my body,¹¹⁷—I know all the same that in every one of these attempts I am undertaking an impossibility, for every one of them presumes an archimedean point which in reality does not exist. It is with Kant that at last man becomes conscious that he has all along been a mere creator of myths. Kant's critical work is the Copernican turning-point in the history of our intellectual life.

But with this not only does the more or less consciously dreamed philosophic myth collapse, but also the entirely unconscious presumption of our daily life, the unsophisticated prime dogma of all dogmas, that our perceptions correspond to things. According to Kant's view, which I have just set forth, Thinking and Perception behave far more like two mirrors set the one over against the other, from which each throws back the pictures to the other from which it has received them and neither can see whether the picture which is formed in it, which it can only see in the other mirror, exactly corresponds to an externally present concrete object. This recognition, which we are able to maintain proceeds from Kant's method of viewing the world, has been summed up by

the Sage into one word, the meaning of which must be clear and familiar to you,—the word *Erscheinung*, phenomenon. It is only when this word has acquired a living meaning for you that you can know exactly how Kant's eye viewed the world. I should like to sum up in a formula what is to be said about this.

What in our everyday life we call Things are phenomena. What we suspect behind the phenomena are, Things of thought, that is to say, empty conceptions in which it is impossible to think anything because we cannot conceive in them anything perceptible, therefore a nonentity. It is impossible to separate the Ego from the Things: The Ego also is a phenomenon, and what we seek for behind it is a Thing of thought, or to speak more accurately, a blind notion, a nonentity.

I should wish these words to be considered until they have perceptibly laid hold of your mind, so that you may understand that all that surrounds us and all that we ourselves are and in which we live and work are literally similitudes, as the poet says, and phenomena (not Things in themselves), as the philosopher is compelled to express himself.

So of the Thing we know nothing, we only know phenomena. And of the contrast between the universal body and the Ego-body, so often touched upon, you know that they both correspond, and that therefore what holds good of the one is equally applicable to the other: I am only conscious of myself when I am conscious of other Things, I am therefore just as much a phenomenon as they are. But that this whole appreciation is not a "mere sham" you can perceive from the following explanation of Kant's, "the doctrine of all true idealists from the eleatic school to Bishop Berkeley is contained in this formula: all recognition by the senses and by experience is nothing but mere sham, and it is only in the ideas of pure understanding and (pure) reason that

truth exists. The principle which entirely rules and pervades my idealism is, on the contrary,—all recognition of Things out of mere pure understanding, or pure reason is nothing but utter sham, and truth exists in experience alone."¹¹⁸

I have been at some pains to look out this last quotation, for I foresaw full well that you would cast it in my teeth that all this might well be an incontestable, but at the same time perfectly superfluous, subtlety; for if all which we call Things, ourselves included, are in reality phenomena, not shams, but realities as firm as rocks, now everything would end by remaining in the old, most wholesome and most popular realism. With reference to that Kant himself will not find fault with you: he says, "what Things may be in themselves I neither know nor need to know, because a Thing can never appear to me otherwise than as a phenomenon." (R.V. 332 *seq.*). He, moreover, teaches expressly the "reality, i.e. the objective value of space in view of all that which can appear to us outwardly as object." (R.V. 44.) But this very thing, the henceforth irrefutable objective value of space, is an important result of criticism; for it is precisely this objective value of space and of things in it that has been often enough threatened by the philosophers: Kant fights here for the unconditioned, unbounded, law-abiding value of all science of nature, and in general for that which we may in its noblest meaning call "common sense." But the point of this critical analysis of the human intellect is, as you see, turned in another direction. In order to assure the permanent authority of objective experience, of science, of common sense, they must not only be raised to the throne, but their enemies, continually springing up anew, must be destroyed, and here we are served by the recognition that we only have to deal with phenomena. For out of mere phenomena we cannot arrive at absolute recognition. That is the great result

of criticism, a result which was bound to transform our whole conception of the being of man from the very foundations, if it should ever be possible to preach it among all cultured people. Kant shows, with an overwhelming mass of proofs, that as soon as our Thinking flies or tries to fly or professes to fly (it is all the same) above the domain of experience to which our Thinking as well as our Seeing is alone directed, it gets into a tangle of nonsense and contradictions, and that only the might of dogmas incapable of proof and in reality senseless can apparently save it from unavoidable bankruptcy. And Kant shows, what no man had suspected before him, why that occurs and how it happens and we always hear the tag,—the mistake is that we take mere phenomena for Things, and that we hold mere conceptions coined upon phenomena alone, as the appreciations of reason, and so apply them as if their value reached beyond all experience. The greatest philosophers contradict each other, and with their contradictory assertions one set of them is just as right and just as wrong as the others. If you carry our historical excursus of to-day in your mind, you know exactly how this hangs together. The different possible fundamental conceptions of mankind are ever legitimised: but the delusion of a fight for the mastery has vanished,—vanished also is the fallacy of a so-called development through error to truth. Kant has mown down the Dogmas for all time. Idealism, Realism, Materialism, Scepticism, Monism, Dualism, Pantheism, Solipsism, Theism, Atheism,—all the “isms” that ever were or ever will be! The chatter of decades of centuries is swept away! For we are encircled all round by mere phenomena; Goethe’s “all that is transitory is but a similitude,” is the quintessence of what the poet had learnt in Kant. We are not competent to attain to Things, we can do nothing with them: we do not know whether the corporeal world is a unity or a plurality, whether it is

mutable or immutable, transient or permanent, finite or infinite ; we do not know whether the Ego of the soul and material nature belong to a common substratum or are twofold ; we cannot therefore decide anything as to whether Thinking and Expansion belong to different essences, or are only different conditions of one identical essence ; we possess no organ, no capacity ever even to arrive at the consideration of such questions—except in the blindness of uncritical ignorance.¹¹⁹ We may maintain that our power of judgment enjoins on us always to proceed on the assumption that there exists a certain fitness between nature and our human reason. But we can never discover how far this fitness in reality reaches. And so Kant is able at the end of his critical masterpiece to utter the proud, artless words, “the greatest and maybe only use of all philosophy of pure reason is therefore perhaps only negative, inasmuch as it does not serve as an organon for expansion, but as a discipline for fixing boundaries, and instead of discovering truth has only the silent merit of warding off errors.” Kant’s achievement is the final annihilation for all time of those dogmas which fly above the bounds of experience, as well of all religious dogmas as of all those of philosophy and natural science.

It is when you penetrate deeply into Kant’s works that you will acquire a detailed and convincing knowledge upon these points. I must be content if I have shown you distinctly how sharply and in what a purely scientific way this eye of Kant’s, in contradistinction to all philosophical subtilisations, penetrated and illuminated the inmost network of the mind. That is the individual momentum which we must strive to realise. Kant bases himself upon facts,—upon facts which we must see with our eyes,—not upon definitions and terminological hair-splittings and syllogistic demonstrations. Kant speaks out bluntly : “as a matter of doctrine, philosophy seems

to be quite unnecessary, or rather out of place, because after all the attempts that have been made with it up to the present time little or no ground has been gained"; and I think that you will be amazed at the precipice, the all-devouring abyss of misunderstanding, to use no harder word, when you see Kant's most famous pupil, Fichte, draw his well-known *Entweder-Oder* (one thing or the other) as a result from the teaching of the master, and so in Kant's lifetime pave the way for the reaction of the dogmatists and philosophical professors against the work of critical liberation. For Fichte wrote to Kant himself, "we have no right to banish scholasticism"; he reintroduces the "absolute" into philosophy, and deduces from Kant's critique, that either the Ego must be explained out of the world, or as he expresses it the Non-ego, or conversely the world, out of the Ego; and so he chooses the latter, and builds up the monstrous system from which Kant solemnly and publicly dissociated himself, and which he with his usual felicity describes as "a sort of spectre, which, when one thinks that one has grasped it, vanishes, so that one finds before one no object but only oneself, and even of oneself only the hand which clutched at it."¹²⁰ That was the road over which German academical philosophy was to travel to the present day, as if Kant had never lived. And in order that Kant should fade out of the living consciousness of student youth, and of the working and enquiring and practically active men apart from the professorial chairs, there was drawn up that series of classical heroes that you find in every German book: Kant, Fichte, Schelling, Hegel, Schleiermacher, Herbart, as if there were any single tie of inner relationship binding Kant to any one of these men, and as if his anti-dogmatic life-work, aimed at the eternal annihilation of all scholastic wisdom, had anything in common with the achievements of these doughty men,—in some sense also men of genius,—but who might as well

have lived a thousand years before Kant, for any trace that his work left upon them.

There will be many who will wish to add a name here; they will say that Schopenhauer was the complement of Kant. And yet it was precisely Schopenhauer who attempted more than the others, and by virtue of his brilliant gifts effected more, towards demolishing the peculiar critical and methodically scientific thoughts of Kant. Between Kant's critique and Schopenhauer's dogmatics there is no bridge.

You, on the other hand, gentlemen, have, unless I am mistaken, now fully realised that since Kant's critique has enlightened us as to the metaphysics of our inner man, it is unpermissible to speak of the World and of the Ego as if they were two different and distinguishable "Things" which it would be possible to contrast with Fichte's "one or the other" of Ego and World, or as Schopenhauer expresses it of Will and Conception (*Wille und Vorstellung*). The distinction between World and Ego is a necessary method, but not the establishment of a fact.¹²¹ But you would only have half understood if you did not grasp that it is at the same time impossible dogmatically to come to a conclusion as to the unity of the two, as do Fichte as well as Schopenhauer. The fundamental point here lies on the hither side of unity and plurality, for what we conceive as World and as Ego are simply two ideas, and indeed the two primary ideas which embrace all others.¹²² And since, as we have seen, it is not possible to make a clean separation between the corporeal world and the Ego world, all the elements of both being intertwined round one another, we may maintain that these two ideas issue from one point, one single *focus imaginarius* indicated in the first lecture. And so a more exact analysis joins together again what analysis had severed. Still, this unity of Kant's has nothing in common with the deduction accepted out of a

common unified principle, and it is the opposite contradiction of the universal unity preached by Bruno. For in the latter, in spite of all its tricked-out finery of logically dialectical arguments, we saw nothing less, but also nothing more, than a grand and yet arbitrary representation of myths, as one of the various dreams by which we men are haunted when we give the reins to our reason and to our phantasy. The unity revealed by Kant, on the contrary, is a result of the critically deliberated analysis of experience.

I believe that we have reached the goal which I had proposed to myself in this lecture: I have ferried you across from one World into the other, out of the world of dogmas into the world of the critical analysis of experience and of scientifically methodical thought. And if you cast your thoughts back upon our schematic survey, you will surely agree with me if I repeat my contention that Kant belongs to the Goethe-Schopenhauer group with its Thinking inwards and Seeing outwards. Yet while all the others, with the exception of Plato, remain fixed in their inborn method of tendency and one-sidedness,—Kant, as you have now seen, by his scientific, and in a certain sense anti-philosophical, critique of the human intellect, overpowers this individual dogmaticism which is, so to say, the birthright of us all. He utterly shakes off the fetters in which his predecessors and followers are enchained. But this highest wisdom demands at the same time a high moral courage, for, as you will see in our last two lectures, every step means renunciation: renunciation of so-called knowledge, renunciation of the delusions of decades of centuries, renunciation of any help that might be hoped for from without. It requires, moreover, great qualities of character, an incorruptible love of truth, a most intimate power of belief, a fulfilment of duty apart from all other considerations; without these it would be hardly possible even transiently to under-

stand Kant's standpoint and to view the world as he saw it ; for we are dealing here more with a question of fact than of thought. Yet the reward is not wanting. Between nature and personality, between the recognised necessity and the experience of freedom, between must and should, between world and God as the unknown uniting power, as *nodus et vinculum mundi*, standing as the point where the Universal crosses and meets,—so, set up between horizons ever flying apart, stands the power of reason as Kant's critical eye sees it. Man can never lack matter for investigation, for poetry and for dreaming, above all for dealing with, and conscious equipment of, himself. Kant's whole Thinking is rooted in the practical : that we shall see more and more in the two last lectures. It was necessary in the interests of the practical aims of the free man that dogmatics should be annihilated. Ripe for high destinies. That is man as Kant saw him.

In the two final lectures we shall be moving in this new philosophy of Kant's, only here once more for the study of the personality and its peculiar character, not of systematic details, still moving essentially with greater freedom owing to the higher level which we have attained. Plato will render us good service in the endeavour to contemplate nature through the eye of Kant : these two men stand very near to one another, and the unschooled, childlike loftiness of the one will make it easier to understand the method of perception of the other, scholastically dressed up as it is, and disentangling itself out of thousands of years of ratiocination. This survey of nature will lead us to the final survey of the inner man : there Kant alone can give us the lead.

END OF VOL. I

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